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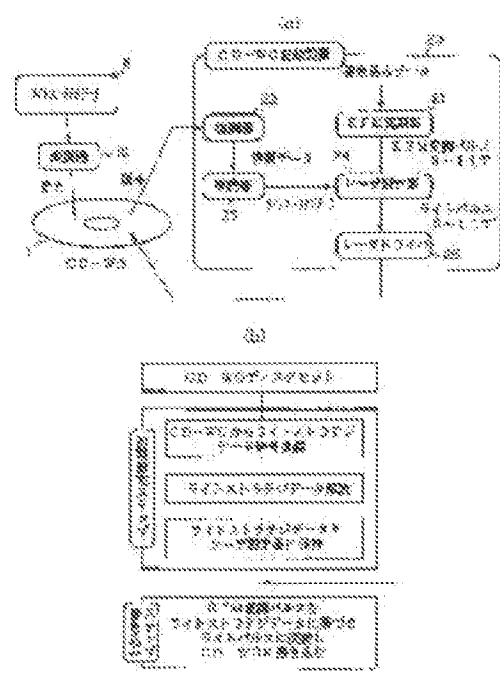
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(54) METHOD FOR RECORDING WRITE-ONCE TYPE COMPACT DISK AND MANUFACTURE FOR THE DISK



(57)Abstract:

PURPOSE: To write by a write-strategy proper to a CD-WO, irrespective of the combination of the CD-WO and a CD-WO recording device.

CONSTITUTION: A modulation signal of a write-strategy data 11 modulated by a modulator 10 is preliminarily recorded in a write-once type compact disk 1 when the disk is manufactured. When the disk 1 is set to a CD-WO recording device 20, the strategy data are demodulated by a demodulator 22, analyzed by an analyzer 23 and stored in a laser-setting device 24. At the writing-in, a laser driver 25 is controlled with the use of a write-strategy designated by the write-strategy data read out from the disk used by the recording device.

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CLAIMS

[Claim(s)]

[Claim 1] The recordable compact disk with which the modulating signal of the light
strategy data modulated by the predetermined approach is beforehand recorded at the
time of manufacture, The demodulator and decoder for reading said rye toss TORAJI data
from this disk, It consists of a recordable compact disk recording device which has a laser
setter for changing an eight-to-fourteen modulation pulse into the light pulse according to
said light strategy data. This recording device The recordable compact disk record
approach characterized by writing in using the light strategy specified by the light strategy
data read from said disk which this recording apparatus uses.

[Claim 2] The recordable compact disk with which the modulating signal of the light
strategy identifier modulated by the predetermined approach is beforehand recorded at
the time of manufacture, The demodulator for reading said identifier from this disk and a
decoder, and the table that consists of light strategy data corresponding to said identifier
and this identifier, A means to search the light strategy data corresponding to said
identifier from this table, It consists of a recordable compact disk recording device which
has a laser setter for changing an eight-to-fourteen modulation pulse into the light pulse
according to said searched light strategy data. This recording apparatus is the recordable
compact disk record approach characterized by writing in using the light strategy
according to the identifier read from said disk which this recording apparatus uses.

[Claim 3] The recordable compact disk record approach according to claim 2
characterized by using the record ingredient identifier assigned for every record ingredient
of a disk as said identifier.

[Claim 4] The manufacture approach of a recordable compact disk that said light strategy
data or identifier is characterized by what is recorded into La Stampa in a cutting process
in the manufacture approach of the recordable compact disk which records beforehand

the modulating signal of the light strategy data modulated by the predetermined approach, or an identifier at the time of manufacture.

[Claim 5] The manufacture approach of the recordable compact disk characterized by becoming irregular by the amount distribution pattern of reflected lights, and recording said light strategy data or identifier on the coldhearted news field of a disk in the manufacture approach of the recordable compact disk which records beforehand the modulating signal of the light strategy data modulated by the predetermined approach, or an identifier at the time of manufacture.

[Claim 6] The manufacture approach of the recordable compact disk characterized by recording said light strategy data or identifier on the coldhearted news field of a disk as a pit by which eight-to-fourteen modulation was carried out in the manufacture approach of the recordable compact disk which records beforehand the modulating signal of the light strategy data modulated by the predetermined approach, or an identifier at the time of manufacture.

[Claim 7] The manufacture approach of the recordable compact disk characterized by what is become irregular and recorded in the manufacture approach of the recordable compact disk which records beforehand the modulating signal of the light strategy data modulated by the predetermined approach, or an identifier at the time of manufacture by the frequency pattern on which said light strategy data or identifier is superimposed by the PURIGURUBU wobble frequency.

[Claim 8] The manufacture approach of the recordable compact disk characterized by setting the modulating signal of the light strategy data modulated by the predetermined approach, or an identifier to the manufacture approach of the recordable compact disk beforehand recorded at the time of manufacture, and modulating and recording said light strategy data or identifier as ATIP special information on a lead-in groove field.

[Claim 9] The manufacture approach of the recordable compact disk characterized by modulating and recording said light strategy data or identifier in the manufacture approach of the recordable compact disk which records beforehand the modulating signal of the light strategy data modulated by the predetermined approach, or an identifier at the time of manufacture as ATIP special information by which extended application was carried out in addition to the lead-in groove field and the program field.

[Claim 10] The manufacture approach of the recordable compact disk characterized by carrying out FM modulation and recording the frequency on which said light strategy data or identifier is superimposed by the PURIGURUBU wobble frequency in an ATIP format in the manufacture approach of the recordable compact disk which records beforehand the modulating signal of the light strategy data modulated by the predetermined approach, or an identifier at the time of manufacture.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention is used for operation of the data-logging approach of a recordable compact disk, and this record approach, and relates to the manufacture approach of a suitable recordable compact disk.

[0002]

[Description of the Prior Art] A write once optical disk has the descriptions, like capacity with the high dependability of the recorded signal without a possibility of erasing accidentally [are the disk which can carry out additional record in a user side, and a life is long, and] is large, and taking advantage of capacity being large, by carrying out additional record, apparently, it can manage information as if it rewrote. Although it ** and 3 - 11T (T is 1EFM clock) pit of eight-to-fourteen modulation is formed in the data writing of a recordable compact disk (the following, CD-WO, and brief sketch) Since a regenerative signal will deteriorate if the light pulse of 3-11T is irradiated as it is (based on the reason of pit distortion occurring), The light pulse (this compensation means is called light strategy) suitably compensated to 3-11T is irradiated, and he forms a pit, and is trying to acquire a good regenerative signal.

[0003] The contents of light strategy differ for every record ingredient of CD-WO fundamentally, and unless it records by suitable light strategy, a good regenerative signal is not acquired. The record ingredient currently used for CD-WO which is circulating in current and a commercial scene is divided roughly into cyanine dye and phthalocyanine dye. It is required to record by separate light strategy for an above-mentioned reason to these 2 person. Moreover, also although it says that it divides roughly and there are cyanine dye and phthalocyanine dye, since the presentations of the record ingredient currently used for each disk differ, if it says strictly, it is desirable to make above-mentioned light strategy separate for every CD-WO, respectively.

[0004]

[Problem(s) to be Solved by the Invention] The present CD-WO recording apparatus remains in extent which applies the light strategy which, as for a disk class, even discernment of ** or a record ingredient cannot be performed, is not performing light strategy at all, or was chosen suitably in spite of the above backgrounds. For this reason, if CD-WO of A company is written in with the CD-WO recording device of B company, a good regenerative signal will be acquired, but when it writes in with the CD-WO recording device of C company, a problem is in a regenerative signal. However, when CD-WO of D company is used, the phenomenon of the relation of regenerative-signal quality being reversed has occurred.

[0005] This invention was made in view of the actual condition like ****, and is

irrespective of the combination of CD-WO and a CD-WO recording apparatus to offer the approach for writing in the CD-WO record approach for realizing the writing by light strategy peculiar to CD-WO, and CD-WO by the approach for carrying out extensive manufacture simply, and light strategy peculiar to CD-WO.

[0006]

[Means for Solving the Problem] The recordable compact disk with which the modulating signal of the light strategy data modulated by the (1) predetermined approach is beforehand recorded at the time of manufacture in order that this invention may solve the above-mentioned technical problem. The demodulator and decoder for reading said rye toss TORAJI data from this disk. It consists of a recordable compact disk recording device which has a laser setter for changing an eight-to-fourteen modulation pulse into the light pulse according to said light strategy data. This recording device writing in using the light strategy specified by the light strategy data read from said disk which this recording apparatus uses — or (2) The recordable compact disk with which the modulating signal of the light strategy identifier modulated by the predetermined approach is beforehand recorded at the time of manufacture. The demodulator for reading said identifier from this disk and a decoder, and the table that consists of light strategy data corresponding to said identifier and it. A means to search the light strategy data corresponding to said identifier from this table. It consists of a recordable compact disk recording device which has a laser setter for changing an eight-to-fourteen modulation pulse into the light pulse according to said searched light strategy data. It is characterized by this recording apparatus writing in using the light strategy according to the identifier read from said disk which this recording apparatus uses. Further (3) In the above (2), it is characterized by using the record ingredient identifier assigned for every record ingredient of a disk as said identifier. Furthermore, the modulating signal of the light strategy data modulated by the predetermined approach or an identifier is set to the manufacture approach of the recordable compact disk beforehand recorded at the time of manufacture. (4) — said light strategy data or identifier is recorded into La Stampa in a cutting process — or (5) — becoming irregular by the amount distribution pattern of reflected lights, and recording said light strategy data or identifier on the coldhearted news field of a disk — or (6) — recording said light strategy data or identifier on the coldhearted news field of a disk as a pit by which eight-to-fourteen modulation was carried out — or (7) — modulating and recording said light strategy data or identifier by the frequency pattern on which a PURIGURUBU wobble frequency is overlapped — or (8) — said light strategy data or identifier — ATIP of a lead-in groove field — becoming irregular and recording as information specially — or (9) — ATIP by which extended application was carried out in said light strategy data or identifier in addition to the lead-in groove field and the program field — becoming irregular and recording as information specially — or (10) It is characterized by carrying out FM modulation and recording the frequency on which said light strategy data or identifier is superimposed by the PURIGURUBU wobble frequency in an ATIP format.

[0007]

[Function]

(1) In invention of claim 1, record light strategy data on CD-WO beforehand, and it is

made to write in by the light strategy data to be used and which were read from this disk for every CD-WO, and is not based on the combination of CD-WO and a CD-WO recording device, but can be made to perform suitable writing and playback.

(2) In invention of claim 2, the light strategy identifier is beforehand recorded on CD-WO, and it is made to write in by the light strategy data corresponding to the identifier to be used and which was read from this disk for every CD-WO, and is not based on the combination of CD-WO and a CD-WO recording device, but can be made to perform suitable writing and playback.

(3) In invention of claim 3, it is recording the record ingredient identifier which can be managed with a fraction (comparing with the identifier of disk each) on CD-WO, and it is not based on the combination of CD-WO and a CD-WO recording apparatus, but writing is made in the light strategy according to a record ingredient, and acquire the regenerative signal of practically sufficient quality.

(4) In invention of claim 4, manufacture of CD-WO on which light strategy data or an identifier was recorded is easily enabled in large quantities in a cutting process, without recording light strategy data or an identifier into La Stampa of CD-WO, and performing a record activity to each CD-WO.

(5) In invention of claim 5, use a coldhearted news field, and record of light strategy data or an identifier to CD-WO is enabled, without giving constraint to an information field. The demodulator of a CD-WO recording apparatus and the modulator of the cutting equipment for CD-WO La Stampa manufacture are realized with an easy configuration by moreover using the amount of reflected lights.

[0008] (6) In invention of claim 6, use a coldhearted news field, and record of light strategy data or an identifier to CD-WO is enabled, without giving constraint to an information field. By moreover using eight-to-fourteen modulation, the demodulator of a CD-WO recording device is used also [demodulator / with which the recording device is equipped beforehand / EFM], and an equipment scale is suppressed.

(7) Record light strategy data or an identifier on CD-WO in invention of claim 7, without [without it uses the superposition frequency to a PURIGURUBU wobble frequency and forms an excessive pit groove etc. on a disk, and] giving constraint to the original wobble frequency f_0 .

(8) In invention of claim 8, use the intact ATIP special information field of a lead-in groove field, only add the decode function of light strategy data or an identifier to the conventional ATIP special information decoder, and realize a CD-WO recording device. Moreover, the cutting equipment for CD-WO La Stampa manufacture is realized only by supplying light strategy data or an identifier to the conventional ATIP modulator.

(9) In invention of claim 9, use the ATIP special information field by which extended application was carried out in addition to the lead-in groove field and the program field, use the demodulator of a CD-WO recording device also [demodulator / conventional / ATIP], and suppress an equipment scale. Moreover, the cutting equipment for CD-WO La Stampa manufacture is realized only by changing the data supply gestalt to the conventional ATIP modulator a little.

(10) In invention of claim 10, carry out FM modulation use of the superposition frequency to a PURIGURUBU wobble frequency using an ATIP format, and make ATIP demodulator

circuitry available conventionally in the demodulator circuit of a CD-WO recording device. Moreover, the modulator circuitry of the cutting equipment for CD-WO La Stampa manufacture also makes an ATIP modulator circuit available.

[0009]

[Example] Drawing 1 is a flow Fig. (drawing 1 (b)) for giving the block diagram (drawing 1 (a)) for explaining one example of invention according to claim 1, and its explanation of operation. For one, as for a modulator and 11, CD-WO (recordable compact disk) and 10 are [light strategy data and 20] CD-WO recording devices among drawing. This CD-WO recording device 20 It consists of the eight-to-fourteen modulation machine 21, a demodulator 22, a decoder 23, the laser setter 24, and laser driver 25 grade, the light strategy data 11 used for writing at the time of manufacture of CD-WO1 are modulated with a modulator 10, and the modulating signal is beforehand recorded on CD-WO1. In addition to the eight-to-fourteen modulation machine 21 and laser driver 25 which are equipped from the former, the CD-WO recording apparatus 20 consists of a demodulator 22, a decoder 23, and a laser setter 24. The CD-WO recording apparatus 20 holds the light strategy data which restored to the record signal on a disk 1 with the demodulator 22, data-ized, decoded these recovery data with the decoder 23, and obtained and decoded light strategy data inside the laser setter 24, when CD-WO1 is set.

[0010] It is an initialization step, and the above writes in next and shifts to a step. At a write-in step, based on the light strategy data set as the interior of the laser setter 24, the input eight-to-fourteen modulation pulses 3-11T are changed into the suitable light pulse 3 ~ 11T', and it outputs to a laser driver 25.

[0011] A block diagram for drawing 2 to explain one example of invention according to claim 2 (drawing 2 (a)). And the flow Fig. (drawing 2 (b)) for giving the explanation of operation and the example of a configuration of a table (drawing 2 (c)) are shown, and, as for an identifier and 26, 12 are [a table and 27] the table retrieval sections among drawing. In addition, the same reference number as the case of drawing 1 is given to the part which carries out the same operation as the example shown in drawing 1 . It **, and at the time of manufacture of CD-WO1, instead of recording the light strategy data 11 used for the writing shown in drawing 1 , this invention modulates the identifier 12 of light strategy data, and records that modulating signal on CD-WO1 beforehand. As an identifier 12, as shown in drawing 2 R> 2 (c) , there is a disk identifier (for B type of A company, D type of Did1 and C company is Did2 etc.) uniquely assigned to CD-WO of the same class, for example. In addition to the eight-to-fourteen modulation machine 21 and laser driver 25 which are equipped from the former, the CD-WO recording apparatus 20 consists of a demodulator 22, a decoder 23, a light strategy data table 26, the table retrieval section 27, and a laser setter 24. When CD-WO1 is set, the CD-WO recording apparatus 20 restores to the record signal of a disk 1 with a demodulator 22, and data-izes, these recovery data are decoded with a decoder 23, an identifier is obtained, a table 26 is searched by the table retrieval section 27, the light strategy data corresponding to this identifier are acquired, and the decoded light strategy data are held inside the laser setter 24.

[0012] It is an initialization step, and the above writes in next and shifts to a step. At a write-in step, based on the light strategy data set as the interior of the laser setter 24, the input eight-to-fourteen modulation pulses 3-11T are changed into the suitable light

pulse 3 ~ 11T', and it outputs to a laser driver 25.

[0013] Invention according to claim 3 is what was made to perform the writing in light strategy peculiar to a specific record ingredient using the record ingredient identifier (cyanine dye is Mid1 and phthalocyanine dye is Mid2 etc.) uniquely assigned to the same record ingredient as said identifier 12, and if it does in this way, the class of record ingredient identifier can be far managed with a fraction as compared with the class of disk identifier assigned to disk each.

[0014] Invention according to claim 4 records the light strategy data 11 or an identifier 12 on CD-WO La Stampa in the cutting process of CD-WO1, by this, carries out extensive reproduction of the substrate from La Stampa, produces a record ingredient, and manufactures above-mentioned CD-WO1.

[0015] Invention according to claim 5 reads the above-mentioned data which become irregular with the amount distribution pattern of reflected lights, and show the above-mentioned light strategy data 11 or an above-mentioned identifier 12 in the CD-WO disk sectional view of drawing 3 (a) and which record all over the coldhearted news field A on CD-WO, and are recorded on CD-WO from the amount signal of reflected lights of this field by the CD-WO recording apparatus 20. When there is PURIGURUBU like CD-WO which drawing 3 (b1) and (c1) are the enlarged drawings near [which was shown in drawing 3 (a), respectively] the coldhearted news field A section, and is shown in drawing 3 (b1) Like [the amount level of reflected lights is the low reflection factor R1 (drawing 3 (b2)) and] CD-WO shown in drawing 3 (c1), when there is no PURIGURUBU With the high reflection factor R2 (drawing 3 (c2)), the amount level of reflected lights makes these correspond to binary data, and records binary data by the existence of PURIGURUBU of R_{pca} from the radius R_{min} of the PCA inside.

[0016] As a demodulator 22 in drawing 1 (a) and drawing 2 (a), the CD-WO recording device 20 shown in drawing 4 has low pass filter 22a and RF binary-ized machine 22b, and when CD-WO1 mentioned above is set Pickup 31 is made to scan from a radius R_{min} to R_{pca} by the field discriminator 30. After applying the amount signal of reflected lights acquired from there to low pass filter 22a, it is made binary, and it restores to this binary-ized data, and light strategy data or an identifier is decoded with a decoder 23.

Subsequent actuation is the same as the example shown in drawing 1 or drawing 2 R> 2.

[0017] From the radius R_{min} of CD-WO1, in the field of R_{pca}, drawing 5 (a1) repeats the PURIGURUBU existence in the disk radial two or more times, prepares it, makes this count and multiple-value information correspond, and records them. The CD-WO recording device 20 of drawing 5 (b) detects the count (drawing 5 (a1)) of reflection factor fluctuation. The CD-WO recording device 20 shown in drawing 5 (b) as the demodulator 20 in drawing 1 (a) and drawing 2 (a) — low pass filter 22a and the formation of RF binary — it having vessel 22b and R2 counter 22c, and, when CD-WO1 mentioned above is set Pickup 31 is made to scan from a radius R_{min} to R_{pca} by the field discriminator 30. After applying the amount signal of reflected lights acquired from there to low pass filter 22a and making it binary, it restores to the count data of R2, and light strategy data or an identifier is decoded with a decoder 23. It is the same as the example shown in subsequent drawing 1 of operation or drawing 2.

[0018] La Stampa for CD-WO of the above-mentioned example can be manufactured with

the cutting equipment shown in drawing 6 R> 6. The modulator 40 and shutter 41 which consist of field discriminator 40a and keying-signal generation machine 40b are added to CD-WO cutting equipment usual in drawing 6 R> 6. This KATTENGU equipment is only set from the radius Rmin of CD-WO to the field of R_{pca} by field discriminator 40a, the binary data (drawing 3 (b) ---) which are light strategy data or an identifier. The keying signal generated according to the case of disk manufacture of (c) or the count data (in the case of disk manufacture of drawing 5 (a1)) of R₂ is supplied to a shutter 41, a shutter 41 is opened in the other field, and it functions as usual CD-WO cutting equipment.

[0019] Drawing 7 is drawing for explaining the example of invention indicated to claim 6. This example It is what recorded said light strategy data 11 or identifier 12 all over the coldhearted news field A on CD-WO as an eight-to-fourteen modulation pit as shown in drawing 7 (a). The CD-WO recording device 20 reads the above-mentioned data currently recorded on CD-WO from the EFM signal of this coldhearted news field, as shown in drawing 7 (b).

[0020] In the example shown in drawing 7 , as shown in drawing 7 (a), in the coldhearted news field of R_{pca}, an EFM pit is formed from a radius Rmin, light strategy data or an identifier is recorded on this pit by eight-to-fourteen modulation, and the CD-WO recording device 20 shown in drawing 7 (b) has the demodulator 22 which consists of 22d of field discriminators, and EFM demodulator 22e, and also has the same composition as drawing 1 (a) or drawing 2 (a). The CD-WO recording device 20 restores to the EFM signal acquired from the coldhearted news field A when CD-WO1 mentioned above is set, and the light strategy data or identifier information currently recorded on CD-WO1 by decoding it is acquired. EFM signal demodulator 22e can be used also [what / is used for the pit playback written in the information field], 22d of field discriminators identifies a coldhearted news field or an information field, and if it is the former, as the light strategy data 11 or an identifier 12, it will decode the recovery data, will obtain light strategy data or an identifier, and it processes it noting that it is the usual data, if it is the latter.

[0021] La Stampa for above-mentioned CD-WO can be manufactured with the cutting equipment of drawing 8 . The cutting equipment of drawing 8 is the modulator which consists of an eight-to-fourteen modulation machine 51 and a field discriminator 52 to usual CD-WO cutting equipment, and the thing to which shutters 53-55 were added. Discriminate R_{pca} from the radius Rmin of CD-WO by the field discriminator 52, carry out a shutter 54-55 close and open in the field, respectively, and the beam 57 by the side of the eight-to-fourteen modulation machine 51 is chosen. Cut light strategy data or an identifier as an EFM pit, a shutter 54-55 is open - Made to shut in the other field, respectively, the beam 56 by the side of an ATIP modulator is chosen, and it functions as usual CD-WO cutting equipment.

[0022] Next, invention according to claim 7 is explained. As everyone knows, CD-WO1 has on a disk PURIGURUBU which carried out wobbling (meandering) to radial. A wobbling frequency is 22.05kHz (the following, f₀, and brief sketch). In this invention, it becomes irregular and records by the frequency pattern which superimposes said light strategy data or identifier on this PURIGURUBU wobble frequency. The CD-WO recording apparatus 20 reads the above-mentioned light strategy data or identifier data currently recorded on CD-WO from the frequency pattern on which the wobble frequency of

PURIGURUBU is overlapped. It becomes irregular as a frequency combination pattern which is superimposed on f_1 , f_2 , and — by the PURIGURUBU wobbling frequency f_0 , and superimposes light strategy data or an identifier as an example, and records on CD-WO. For example, it is superimposing f_1 to Information A and superimposing f_2 to Information B etc.

[0023] Drawing 9 (a) is drawing for explaining an example of the CD-WO recording device used for invention of this claim 7. This CD-WO recording device As a demodulator 22 in drawing 1 (a) and drawing 2 (a), 22f 1 or 22f when [of 2 and —] it has 2 and — with ag [1 or 22g] of a band pass filter and 22g [of its detector] and above-mentioned CD-WO1 was set It discriminates from f_1 , f_2 , and — by each band pass filter 22f1, 22f2, and —, 2 and — generate 22g [of detectors] 1 or 22g of detecting signals, a superposition frequency pattern is decoded with a decoder 23, and light strategy data or an identifier is obtained.

[0024] La Stampa for CD-WO of this example can be manufactured with the cutting equipment of drawing 9 R> 9 (b). As for drawing 9 (b), the source selector 61 of a signal and an adder 62 are added to usual CD-WO cutting equipment. The source selector 61 of a signal carries out the selection output of the frequencies f_1 and f_2 of the pattern according to light strategy data or an identifier, and the — signal. f_0 outputted from this output and the ATIP modulator 63 is compounded with an adder 62, and a beam wobble machine is supplied as a wobbling frequency.

[0025] Invention according to claim 8 modulates and records light strategy data or an identifier on CD-WO as ATIP special information on a lead-in groove field, and a CD-WO recording device decodes the ATIP special information on a lead-in groove field, and reads the above-mentioned light strategy data or the identifier currently recorded on CD-WO from the inside. 42 bit data are recorded on PURIGURUBU of CD-WO by FM modulation which makes the wobbling frequency f_0 a carrier frequency. This is called ATIP and the hour entry of a program-on disk field sector is usually included in 24 bits of bits 5-28. ATIP can express special information other than the above with carrying out bits 5, 13, and 21 except zero. It is used in a lead-in groove field, and these special information is hour entries (refer to drawing 10 (a); however) of a lead-in groove field sector, respectively. Only this field is further applied also to the field of inner circumference rather than a lead-in groove field. Record power / application code (refer to drawing 10 R> 0 (b)), Lead-in groove field start time (refer to drawing 10 (c)) and outermost lead-out field start time (refer to drawing 10 (d)) are expressed, and a CD-WO recording apparatus acquires such information, when CD-WO is set, and it equips data writing with it.

[0026] Light strategy data or an identifier is recorded using the field where the application has not become settled among above-mentioned ATIP special information. The bits 5, 13, and 21 of ATIP special information, respectively 0-0-1 (refer to drawing 10 (e)), Except the bits 5 and 13 of the special information field used as 0-1-0 (refer to drawing 10 (f)) and 0-1-1 (refer to drawing 10 (g)), and 21, Or the bits 9-12 (refer to drawing 10 (h)) of record power / disk application special information field, Rye toss TORAJI data or an identifier is recorded on a CD-WO disk using either or the combination of a bit 15 to 20 bits 22-28 (refer to drawing 10 (i)) over a bit 14= 1.

[0027] Drawing 11 (a) is drawing for explaining an example of the CD-WO recording device

used for invention of this claim 8. This CD-WO recording device When it has the ATIP demodulator 72 as a demodulator 22 in drawing 1 (a) and drawing 2 (a), it has the ATIP special information decoder 73 as a decoder 23 and above-mentioned CD-WO1 was set. It restores to the tracking error signal of a lead-in groove field with the ATIP demodulator 72 through f0 band pass filter (BPF) 71. The usual ATIP special information (refer to drawing 10 (a) - (d)) is acquired with the ATIP special information decoder 73, and light strategy data or an identifier (refer to drawing 10 (e) - (i)) is obtained further. In addition, f0 band pass filter 71 and the ATIP demodulator 72 are the same functions as that with which the usual recording device is equipped, and can be made to serve a double purpose. [0028] La Stampa for CD-WO of this example can be manufactured with the cutting equipment of drawing 11 R> 1 (b). As compared with usual CD-WO cutting equipment, the light strategy data or the identifier other than ATIP time data and the usual ATIP special information data (refer to drawing 10 R>0(a) - (d)) is added as supply data to the ATIP modulator 74, and drawing 11 (b) also modulates light strategy data or an identifier as ATIP special information in a lead-in groove field, and also, similarly functions as usual CD-WO cutting equipment.

[0029] Next, invention according to claim 9 is explained. It **, extended application of the ATIP special information fields (drawing 10 R> 0 (b) - (g)) other than the hour entry of the lead-in groove field sector of drawing 10 (a) applied only to the lead-in groove field is carried out in this invention in addition to a lead-in groove field and a program field (refer to drawing 3 (a)), they are used, and light strategy data or an identifier is modulated and recorded on a CD-WO disk. For example, light strategy data or an identifier is recorded on PMA of drawing 3 (a), PCA, and the coldhearted news field of the inner circumference in the ATIP special information field by which extended application was carried out. A CD-WO recording device reads the above-mentioned data which decode the ATIP special information on this field, and are recorded on CD-WO from the inside.

[0030] Drawing 12 (a) is drawing for explaining an example of the CD-WO recording device used for the invention 9 of this claim 9. This CD-WO recording device Have the ATIP demodulator 82 as a demodulator 22 in drawing 1 (a) and drawing 2 (a), and it has two ATIP special information decoders field discriminator 83a, 83b for lead-in groove fields, and for lead-in groove inner circumference field 83c as a decoder 23. When above-mentioned CD-WO is set, a lead-in groove field is accessed and field discriminator 83a chooses ATIP special information decoder 83a for lead-in groove fields. It not only acquires the conventional ATIP special information, but A lead-in groove inner circumference field is also accessed, and in that case, field discriminator 83a chooses ATIP special information decoder 83c for lead-in groove inner circumference fields, and obtains light strategy data or an identifier. In addition, f0 band pass filter 81, the ATIP demodulator 82, and ATIP special information decoder 83b for lead-in groove fields are the same functions as that with which the usual recording device is equipped, and can be made to serve a double purpose.

[0031] La Stampa for CD-WO of this example can be manufactured with the cutting equipment of drawing 12 R> 2 (b). The configuration and function which the cutting equipment of drawing 12 (b) has field discriminator 84a, chooses the usual ATIP special information data (refer to drawing 10 (a) - (d)) in a lead-in groove field as supply data to

ATIP modulator 84b to usual CD-WO cutting equipment, and choose light strategy data or an identifier in a lead-in groove inner circumference field are added. Light strategy data or an identifier is modulated as ATIP special information in a lead-in groove inner circumference field, and also, similarly it functions as usual CD-WO cutting equipment.

[0032] Next, invention according to claim 10 is explained. In an ATIP format, FM modulation is carried out and this invention records another frequency f_1 on which said light strategy data or identifier is superimposed to the PURIGURUBU wobble frequency f_0 , and light strategy data or an identifier carries out FM modulation of f_1 , for example, it is recorded all over CD-WO. A CD-WO recording apparatus obtains the above-mentioned data which restore to it and decode the superposition frequency f_1 of the PURIGURUBU wobble frequency f_0 , and are recorded on CD-WO.

[0033] Drawing 13 (a) is drawing for explaining an example of the CD-WO recording device used for invention of claim 10. This CD-WO recording device When it has the demodulator 94 which consists of f_1 band-pass-filter 94a and FM demodulator 94b as a demodulator 22 in drawing 1 (a) and drawing 2 (a) and above-mentioned CD-WO was set it accesses a lead-in groove field, and it not only acquires ATIP special information by the usual approach, but f_1 band-pass-filter 94a and FM demodulator 94b perform FM recovery to a carrier frequency f_1 , and it obtains light strategy data or an identifier from a decoder 95. Since a format of ATIP is used as a data gestalt of FM modulation, except for the point that carrier frequencies differ, the circuitry of the conventional ATIP demodulator can be diverted to a demodulator.

[0034] La Stampa for CD-WO of this example can be manufactured with the cutting equipment of drawing 13 R> 3 (b). The function which drawing 13 (b) has FM modulator 95a and adder 95b to usual CD-WO cutting equipment, carries out FM modulation of light strategy data or the identifier, and superimposes a carrier frequency f_1 on the wobble frequency f_0 is added. Since a format of ATIP is used as a data gestalt of FM modulation, except for the point that carrier frequencies differ, the circuitry of the conventional ATIP modulator can be diverted to a modulator.

[0035]

[Effect of the Invention]

(1) Effectiveness corresponding to claim 1 : since a CD-WO recording apparatus writes in by the light strategy data to be used and which were read from the disk for every CD-WO, it is not based on the combination of CD-WO and a CD-WO recording apparatus, but suitable writing is made, and a good regenerative signal is acquired.

(2) Effectiveness corresponding to claim 2 : since a CD-WO recording apparatus writes in by the light strategy data corresponding to the identifier which has the table of an identifier and light strategy data and is used and which was read from the disk for every CD-WO, it is not based on the combination of CD-WO and a CD-WO recording apparatus, but a regenerative signal with suitable good writing is acquired. Moreover, generally an identifier has the merit which there is less amount of information than light strategy data, and ends.

(3) Effectiveness corresponding to claim 3 : by recording the record ingredient identifier which can be managed with a fraction as compared with the identifier of disk each on CD-WO, it is not based on the combination of CD-WO and a CD-WO recording apparatus, but

writing is made by the light strategy data according to a record ingredient, and the regenerative signal of practically sufficient quality is acquired.

(4) Effectiveness corresponding to claim 4 : in a cutting process, CD-WO on which light strategy data or an identifier was recorded can be manufactured in large quantities easily, without performing a record activity to each CD-WO, since light strategy data or an identifier is recorded into La Stampa of CD-WO.

(5) Effectiveness corresponding to claim 5 : light strategy data or an identifier can be recorded on CD-WO, without giving constraint to an information field in addition to claim 1 thru/or an operation and effectiveness of 3, since a coldhearted news field is used. Since the amount of reflected lights is moreover used, the demodulator of a CD-WO recording apparatus and the modulator of the cutting equipment for CD-WO La Stampa manufacture are realizable with an easy configuration.

(6) Effectiveness corresponding to claim 6 : since a coldhearted news field is used, in addition to claim 1 thru/or an operation and effectiveness of 3, light strategy data or an identifier can be recorded on CD-WO, without giving constraint to an information field. Since eight-to-fourteen modulation is moreover used, the demodulator of a CD-WO recording device can be used also [demodulator / with which the recording device is equipped beforehand / EFM], and an equipment scale can be suppressed.

(7) Effectiveness corresponding to claim 7 : light strategy data or an identifier can be recorded on CD-WO, without [since the superposition frequency to a PURIGURUBU wobble frequency is used, without it forms an excessive pit groove etc. on a disk in addition to claim 1 thru/or an operation and effectiveness of 3, and] giving constraint to the original wobble frequency f_0 .

(8) Effectiveness corresponding to claim 8 : since the intact ATIP special information field of a lead-in groove field are used, in addition to claim 1 thru/or an operation and effectiveness of 3, a CD-WO recording device is realizable only by adding the decode function of light strategy data or an identifier to the conventional ATIP special information decoder. Moreover, the cutting equipment for CD-WO La Stampa manufacture is realizable only by supplying light strategy data or an identifier to the conventional ATIP modulator.

(9) Effectiveness corresponding to claim 9 : since the ATIP information field by which extended application was carried out in addition to the lead-in groove field and the program field are used, in addition to claim 1 thru/or an operation and effectiveness of 3, the demodulator of a CD-WO recording device can be used also [demodulator / conventional / ATIP], and an equipment scale can be suppressed. Moreover, the cutting equipment for CD-WO La Stampa manufacture is realizable only by changing the data supply gestalt to the conventional ATIP modulator a little.

(10) Effectiveness corresponding to claim 10 : since FM modulation use of the superposition frequency to a PURIGURUBU wobble frequency is carried out using an ATIP format, in addition to an operation and effectiveness of claim 7, ATIP demodulator circuitry can be conventionally used for the demodulator circuit of a CD-WO recording device. Moreover, the modulator circuitry of the cutting equipment for CD-WO La Stampa manufacture can also use an ATIP modulator circuit.

[Translation done.]

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TECHNICAL FIELD

[Industrial Application] This invention is used for operation of the data-logging approach of a recordable compact disk, and this record approach, and relates to the manufacture approach of a suitable recordable compact disk.

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PRIOR ART

[Description of the Prior Art] A write once optical disk has the descriptions, like capacity with the high dependability of the recorded signal without a possibility of erasing accidentally [are the disk which can carry out additional record in a user side, and a life is long, and] is large, and taking advantage of capacity being large, by carrying out additional record, apparently, it can manage information as if it rewrote. Although it ** and 3 - 11T (T is 1EFM clock) pit of eight-to-fourteen modulation is formed in the data writing of a recordable compact disk (the following, CD-WO, and brief sketch) Since a regenerative signal will deteriorate if the light pulse of 3-11T is irradiated as it is (based on the reason of pit distortion occurring), The light pulse (this compensation means is called light strategy) suitably compensated to 3-11T is irradiated, and he forms a pit, and is trying to

acquire a good regenerative signal.

[0003] The contents of light strategy differ for every record ingredient of CD-WO fundamentally, and unless it records by suitable light strategy, a good regenerative signal is not acquired. The record ingredient currently used for CD-WO which is circulating in current and a commercial scene is divided roughly into cyanine dye and phthalocyanine dye. It is required to record by separate light strategy for an above-mentioned reason to these 2 person. Moreover, also although it says that it divides roughly and there are cyanine dye and phthalocyanine dye, since the presentations of the record ingredient currently used for each disk differ, if it says strictly, it is desirable to make above-mentioned light strategy separate for every CD-WO, respectively.

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PRIOR ART

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mentioned light strategy separate for every CD-WO, respectively.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] The present CD-WO recording apparatus remains in extent which applies the light strategy which, as for a disk class, even discernment of ** or a record ingredient cannot be performed, is not performing light strategy at all, or was chosen suitably in spite of the above backgrounds. For this reason, if CD-WO of A company is written in with the CD-WO recording device of B company, a good regenerative signal will be acquired, but when it writes in with the CD-WO recording device of C company, a problem is in a regenerative signal. However, when CD-WO of D company is used, the phenomenon of the relation of regenerative-signal quality being reversed has occurred.

[0005] This invention was made in view of the actual condition like ***, and is irrespective of the combination of CD-WO and a CD-WO recording apparatus to offer the approach for writing in the CD-WO record approach for realizing the writing by light strategy peculiar to CD-WO, and CD-WO by the approach for carrying out extensive manufacture simply, and light strategy peculiar to CD-WO.

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MEANS

[Means for Solving the Problem] The recordable compact disk with which the modulating signal of the light strategy data modulated by the (1) predetermined approach is beforehand recorded at the time of manufacture in order that this invention may solve the above-mentioned technical problem, The demodulator and decoder for reading said rye toss TORAJI data from this disk, It consists of a recordable compact disk recording device which has a laser setter for changing an eight-to-fourteen modulation pulse into the light pulse according to said light strategy data. This recording device writing in using the light strategy specified by the light strategy data read from said disk which this recording apparatus uses --- or (2) The recordable compact disk with which the modulating signal of the light strategy identifier modulated by the predetermined approach is beforehand recorded at the time of manufacture, The demodulator for reading said identifier from this disk and a decoder, and the table that consists of light strategy data corresponding to said identifier and it, A means to search the light strategy data corresponding to said identifier from this table, It consists of a recordable compact disk recording device which has a laser setter for changing an eight-to-fourteen modulation pulse into the light pulse according to said searched light strategy data. It is characterized by this recording apparatus writing in using the light strategy according to the identifier read from said disk which this recording apparatus uses. Further (3) In the above (2), it is characterized by using the record ingredient identifier assigned for every record ingredient of a disk as said identifier. Furthermore, the modulating signal of the light strategy data modulated by the predetermined approach or an identifier is set to the manufacture approach of the recordable compact disk beforehand recorded at the time of manufacture. (4) --- said light strategy data or identifier is recorded into La Stampa in a cutting process --- or (5) --- becoming irregular by the amount distribution pattern of reflected lights, and recording said light strategy data or identifier on the coldhearted news field of a disk --- or (6) --- recording said light strategy data or identifier on the coldhearted news field of a disk as a pit by which eight-to-fourteen modulation was carried out --- or (7) --- modulating and recording said light strategy data or identifier by the frequency pattern on which a PURIGURUBU wobble frequency is overlapped --- or (8) --- said light strategy data or identifier --- ATIP of a lead-in groove field --- becoming irregular and recording as information specially --- or (9) --- ATIP by which extended application was carried out in said light strategy data or identifier in addition to the lead-in groove field and the program field --- becoming irregular and recording as information specially --- or (10) It is characterized by carrying out FM modulation and recording the frequency on which said light strategy data or identifier is superimposed by the PURIGURUBU wobble frequency in an ATIP format.

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OPERATION

[Function]

- (1) In invention of claim 1, record light strategy data on CD-WO beforehand, and it is made to write in by the light strategy data to be used and which were read from this disk for every CD-WO, and is not based on the combination of CD-WO and a CD-WO recording device, but can be made to perform suitable writing and playback.
- (2) In invention of claim 2, the light strategy identifier is beforehand recorded on CD-WO, and it is made to write in by the light strategy data corresponding to the identifier to be used and which was read from this disk for every CD-WO, and is not based on the combination of CD-WO and a CD-WO recording device, but can be made to perform suitable writing and playback.
- (3) In invention of claim 3, it is recording the record ingredient identifier which can be managed with a fraction (comparing with the identifier of disk each) on CD-WO, and it is not based on the combination of CD-WO and a CD-WO recording apparatus, but writing is made in the light strategy according to a record ingredient, and acquire the regenerative signal of practically sufficient quality.
- (4) In invention of claim 4, manufacture of CD-WO on which light strategy data or an identifier was recorded is easily enabled in large quantities in a cutting process, without recording light strategy data or an identifier into La Stampa of CD-WO, and performing a record activity to each CD-WO.
- (5) In invention of claim 5, use a coldhearted news field, and record of light strategy data or an identifier to CD-WO is enabled, without giving constraint to an information field. The demodulator of a CD-WO recording apparatus and the modulator of the cutting equipment for CD-WO La Stampa manufacture are realized with an easy configuration by moreover using the amount of reflected lights.
- [0008] (6) In invention of claim 6, use a coldhearted news field, and record of light strategy data or an identifier to CD-WO is enabled, without giving constraint to an information field. By moreover using eight-to-fourteen modulation, the demodulator of a CD-WO recording device is used also [demodulator / with which the recording device is equipped beforehand / EFM], and an equipment scale is suppressed.
- (7) Record light strategy data or an identifier on CD-WO in invention of claim 7, without [without it uses the superposition frequency to a PURIGURUBU wobble frequency and forms an excessive pit groove etc. on a disk, and] giving constraint to the original wobble frequency f0.
- (8) In invention of claim 8, use the intact ATIP special information field of a lead-in groove field, only add the decode function of light strategy data or an identifier to the

conventional ATIP special information decoder, and realize a CD-WO recording device. Moreover, the cutting equipment for CD-WO La Stampa manufacture is realized only by supplying light strategy data or an identifier to the conventional ATIP modulator.

(9) In invention of claim 9, use the ATIP special information field by which extended application was carried out in addition to the lead-in groove field and the program field, use the demodulator of a CD-WO recording device also [demodulator / conventional / ATIP], and suppress an equipment scale. Moreover, the cutting equipment for CD-WO La Stampa manufacture is realized only by changing the data supply gestalt to the conventional ATIP modulator a little.

(10) In invention of claim 10, carry out FM modulation use of the superposition frequency to a PURIGURUBU wobble frequency using an ATIP format, and make ATIP demodulator circuitry available conventionally in the demodulator circuit of a CD-WO recording device. Moreover, the modulator circuitry of the cutting equipment for CD-WO La Stampa manufacture also makes an ATIP modulator circuit available.

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EXAMPLE

[Example] Drawing 1 is a flow Fig. (drawing 1 (b)) for giving the block diagram (drawing 1 (a)) for explaining one example of invention according to claim 1, and its explanation of operation. For one, as for a modulator and 11, CD-WO (recordable compact disk) and 10 are [light strategy data and 20] CD-WO recording devices among drawing. This CD-WO recording device 20 It consists of the eight-to-fourteen modulation machine 21, a demodulator 22, a decoder 23, the laser setter 24, and laser driver 25 grade, the light strategy data 11 used for writing at the time of manufacture of CD-WO1 are modulated with a modulator 10, and the modulating signal is beforehand recorded on CD-WO1. In addition to the eight-to-fourteen modulation machine 21 and laser driver 25 which are equipped from the former, the CD-WO recording apparatus 20 consists of a demodulator 22, a decoder 23, and a laser setter 24. The CD-WO recording apparatus 20 holds the light strategy data which restored to the record signal on a disk 1 with the demodulator 22, data-ized, decoded these recovery data with the decoder 23, and obtained and decoded light strategy data inside the laser setter 24, when CD-WO1 is set.

[0010] It is an initialization step, and the above writes in next and shifts to a step. At a

write-in step, based on the light strategy data set as the interior of the laser setter 24, the input eight-to-fourteen modulation pulses 3-11T are changed into the suitable light pulse 3 ~ 11T', and it outputs to a laser driver 25.

[0011] A block diagram for drawing 2 to explain one example of invention according to claim 2 (drawing 2 (a)), And the flow Fig. (drawing 2 (b)) for giving the explanation of operation and the example of a configuration of a table (drawing 2 (c)) are shown, and, as for an identifier and 26, 12 are [a table and 27] the table retrieval sections among drawing. In addition, the same reference number as the case of drawing 1 is given to the part which carries out the same operation as the example shown in drawing 1. It **, and at the time of manufacture of CD-WO1, instead of recording the light strategy data 11 used for the writing shown in drawing 1, this invention modulates the identifier 12 of light strategy data, and records that modulating signal on CD-WO1 beforehand. As an identifier 12, as shown in drawing 2 R> 2 (c), there is a disk identifier (for B type of A company, D type of Did1 and C company is Did2 etc.) uniquely assigned to CD-WO of the same class, for example. In addition to the eight-to-fourteen modulation machine 21 and laser driver 25 which are equipped from the former, the CD-WO recording apparatus 20 consists of a demodulator 22, a decoder 23, a light strategy data table 26, the table retrieval section 27, and a laser setter 24. When CD-WO1 is set, the CD-WO recording apparatus 20 restores to the record signal of a disk 1 with a demodulator 22, and data-izes, these recovery data are decoded with a decoder 23, an identifier is obtained, a table 26 is searched by the table retrieval section 27, the light strategy data corresponding to this identifier are acquired, and the decoded light strategy data are held inside the laser setter 24.

[0012] It is an initialization step, and the above writes in next and shifts to a step. At a write-in step, based on the light strategy data set as the interior of the laser setter 24, the input eight-to-fourteen modulation pulses 3-11T are changed into the suitable light pulse 3 ~ 11T', and it outputs to a laser driver 25.

[0013] Invention according to claim 3 is what was made to perform the writing in light strategy peculiar to a specific record ingredient using the record ingredient identifier (cyanine dye is Mid1 and phthalocyanine dye is Mid2 etc.) uniquely assigned to the same record ingredient as said identifier 12, and if it does in this way, the class of record ingredient identifier can be far managed with a fraction as compared with the class of disk identifier assigned to disk each.

[0014] Invention according to claim 4 records the light strategy data 11 or an identifier 12 on CD-WO La Stampa in the cutting process of CD-WO1, by this, carries out extensive reproduction of the substrate from La Stampa, produces a record ingredient, and manufactures above-mentioned CD-WO1.

[0015] Invention according to claim 5 reads the above-mentioned data which become irregular with the amount distribution pattern of reflected lights, and show the above-mentioned light strategy data 11 or an above-mentioned identifier 12 in the CD-WO disk sectional view of drawing 3 (a) and which record all over the coldhearted news field A on CD-WO, and are recorded on CD-WO from the amount signal of reflected lights of this field by the CD-WO recording apparatus 20. When there is PURIGURUBU like CD-WO which drawing 3 (b1) and (c1) are the enlarged drawings near [which was shown in drawing 3 (a), respectively] the coldhearted news field A section, and is shown in drawing

3 (b1) Like [the amount level of reflected lights is the low reflection factor R1 (drawing 3 (b2)) and] CD-WO shown in drawing 3 (c1), when there is no PURIGURUBU With the high reflection factor R2 (drawing 3 (c2)), the amount level of reflected lights makes these correspond to binary data, and records binary data by the existence of PURIGURUBU of R_{pca} from the radius R_{min} of the PCA inside.

[0016] As a demodulator 22 in drawing 1 (a) and drawing 2 (a), the CD-WO recording device 20 shown in drawing 4 has low pass filter 22a and RF binary-ized machine 22b, and when CD-WO1 mentioned above is set Pickup 31 is made to scan from a radius R_{min} to R_{pca} by the field discriminator 30. After applying the amount signal of reflected lights acquired from there to low pass filter 22a, it is made binary, and it restores to this binary-ized data, and light strategy data or an identifier is decoded with a decoder 23.

Subsequent actuation is the same as the example shown in drawing 1 or drawing 2 R> 2.

[0017] From the radius R_{min} of CD-WO1, in the field of R_{pca}, drawing 5 (a1) repeats the PURIGURUBU existence in the disk radial two or more times, prepares it, makes this count and multiple-value information correspond, and records them. The CD-WO recording device 20 of drawing 5 (b) detects the count (drawing 5 (a1)) of reflection factor fluctuation. The CD-WO recording device 20 shown in drawing 5 (b) as the demodulator 20 in drawing 1 (a) and drawing 2 (a) — low pass filter 22a and the formation of RF binary — it having vessel 22b and R2 counter 22c, and, when CD-WO1 mentioned above is set Pickup 31 is made to scan from a radius R_{min} to R_{pca} by the field discriminator 30. After applying the amount signal of reflected lights acquired from there to low pass filter 22a and making it binary, it restores to the count data of R2, and light strategy data or an identifier is decoded with a decoder 23. It is the same as the example shown in subsequent drawing 1 of operation or drawing 2 .

[0018] La Stampa for CD-WO of the above-mentioned example can be manufactured with the cutting equipment shown in drawing 6 R> 6. The modulator 40 and shutter 41 which consist of field discriminator 40a and keying-signal generation machine 40b are added to CD-WO cutting equipment usual in drawing 6 R> 6. This KATTENGU equipment is only set from the radius R_{min} of CD-WO to the field of R_{pca} by field discriminator 40a, the binary data (drawing 3 (b) —) which are light strategy data or an identifier The keying signal generated according to the case of disk manufacture of (c) or the count data (in the case of disk manufacture of drawing 5 (a1)) of R2 is supplied to a shutter 41, a shutter 41 is opened in the other field, and it functions as usual CD-WO cutting equipment.

[0019] Drawing 7 is drawing for explaining the example of invention indicated to claim 6. This example It is what recorded said light strategy data 11 or identifier 12 all over the coldhearted news field A on CD-WO as an eight-to-fourteen modulation pit as shown in drawing 7 (a). The CD-WO recording device 20 reads the above-mentioned data currently recorded on CD-WO from the EFM signal of this coldhearted news field, as shown in drawing 7 (b).

[0020] In the example shown in drawing 7 , as shown in drawing 7 (a), in the coldhearted news field of R_{pca}, an EFM pit is formed from a radius R_{min}, light strategy data or an identifier is recorded on this pit by eight-to-fourteen modulation, and the CD-WO recording device 20 shown in drawing 7 (b) has the demodulator 22 which consists of 22d of field discriminators, and EFM demodulator 22e, and also has the same composition as

drawing 1 (a) or drawing 2 (a). The CD-WO recording device 20 restores to the EFM signal acquired from the coldhearted news field A when CD-WO1 mentioned above is set, and the light strategy data or identifier information currently recorded on CD-WO1 by decoding it is acquired. EFM signal demodulator 22e can be used also [what / is used for the pit playback written in the information field], 22d of field discriminators identifies a coldhearted news field or an information field, and if it is the former, as the light strategy data 11 or an identifier 12, it will decode the recovery data, will obtain light strategy data or an identifier, and it processes it noting that it is the usual data, if it is the latter.

[0021] La Stampa for above-mentioned CD-WO can be manufactured with the cutting equipment of drawing 8. The cutting equipment of drawing 8 is the modulator which consists of an eight-to-fourteen modulation machine 51 and a field discriminator 52 to usual CD-WO cutting equipment, and the thing to which shutters 53-55 were added. Discriminate R_{pca} from the radius R_{min} of CD-WO by the field discriminator 52, carry out a shutter 54-55 close and open in the field, respectively, and the beam 57 by the side of the eight-to-fourteen modulation machine 51 is chosen. Cut light strategy data or an identifier as an EFM pit, a shutter 54-55 is open ~ Made to shut in the other field, respectively, the beam 56 by the side of an ATIP modulator is chosen, and it functions as usual CD-WO cutting equipment.

[0022] Next, invention according to claim 7 is explained. As everyone knows, CD-WO1 has on a disk PURIGURUBU which carried out wobbling (meandering) to radial. A wobbling frequency is 22.05kHz (the following, f₀, and brief sketch). In this invention, it becomes irregular and records by the frequency pattern which superimposes said light strategy data or identifier on this PURIGURUBU wobble frequency. The CD-WO recording apparatus 20 reads the above-mentioned light strategy data or identifier data currently recorded on CD-WO from the frequency pattern on which the wobble frequency of PURIGURUBU is overlapped. It becomes irregular as a frequency combination pattern which is superimposed on f₁, f₂, and --- by the PURIGURUBU wobbling frequency f₀, and superimposes light strategy data or an identifier as an example, and records on CD-WO. For example, it is superimposing f₁ to Information A and superimposing f₂ to Information B etc.

[0023] Drawing 9 (a) is drawing for explaining an example of the CD-WO recording device used for invention of this claim 7. This CD-WO recording device As a demodulator 22 in drawing 1 (a) and drawing 2 (a), 22f 1 or 22f when [of 2 and ---] it has 2 and --- with ag [1 or 22g] of a band pass filter and 22g [of its detector] and above-mentioned CD-WO1 was set It discriminates from f₁, f₂, and --- by each band pass filter 22f₁, 22f₂, and ---, 2 and --- generate 22g [of detectors] 1 or 22g of detecting signals, a superposition frequency pattern is decoded with a decoder 23, and light strategy data or an identifier is obtained.

[0024] La Stampa for CD-WO of this example can be manufactured with the cutting equipment of drawing 9 R> 9 (b). As for drawing 9 (b), the source selector 61 of a signal and an adder 62 are added to usual CD-WO cutting equipment. The source selector 61 of a signal carries out the selection output of the frequencies f₁ and f₂ of the pattern according to light strategy data or an identifier, and the --- signal, f₀ outputted from this output and the ATIP modulator 63 is compounded with an adder 62, and a beam wobble

machine is supplied as a wobbling frequency.

[0025] Invention according to claim 8 modulates and records light strategy data or an identifier on CD-WO as ATIP special information on a lead-in groove field, and a CD-WO recording device decodes the ATIP special information on a lead-in groove field, and reads the above-mentioned light strategy data or the identifier currently recorded on CD-WO from the inside. 42 bit data are recorded on PURIGURUBU of CD-WO by FM modulation which makes the wobbling frequency f_0 a carrier frequency. This is called ATIP and the hour entry of a program-on disk field sector is usually included in 24 bits of bits 5-28. ATIP can express special information other than the above with carrying out bits 5, 13, and 21 except zero. It is used in a lead-in groove field, and these special information is hour entries (refer to drawing 10 (a); however) of a lead-in groove field sector, respectively. Only this field is further applied also to the field of inner circumference rather than a lead-in groove field. Record power / application code (refer to drawing 10 R> 0 (b)), Lead-in groove field start time (refer to drawing 10 (c)) and outermost lead-out field start time (refer to drawing 10 (d)) are expressed, and a CD-WO recording apparatus acquires such information, when CD-WO is set, and it equips data writing with it.

[0026] Light strategy data or an identifier is recorded using the field where the application has not become settled among above-mentioned ATIP special information. The bits 5, 13, and 21 of ATIP special information, respectively 0-0-1 (refer to drawing 10 (e)), Except the bits 5 and 13 of the special information field used as 0-1-0 (refer to drawing 10 (f)) and 0-1-1 (refer to drawing 10 (g)), and 21, Or the bits 9-12 (refer to drawing 10 (h)) of record power / disk application special information field, Rye toss TORAJI data or an identifier is recorded on a CD-WO disk using either or the combination of a bit 15 to 20 bits 22-28 (refer to drawing 10 (i)) over a bit 14= 1.

[0027] Drawing 11 (a) is drawing for explaining an example of the CD-WO recording device used for invention of this claim 8. This CD-WO recording device When it has the ATIP demodulator 72 as a demodulator 22 in drawing 1 (a) and drawing 2 (a), it has the ATIP special information decoder 73 as a decoder 23 and above-mentioned CD-WO1 was set It restores to the tracking error signal of a lead-in groove field with the ATIP demodulator 72 through f_0 band pass filter (BPF) 71. The usual ATIP special information (refer to drawing 10 (a) - (d)) is acquired with the ATIP special information decoder 73, and light strategy data or an identifier (refer to drawing 10 (e) - (i)) is obtained further. In addition, f_0 band pass filter 71 and the ATIP demodulator 72 are the same functions as that with which the usual recording device is equipped, and can be made to serve a double purpose.

[0028] La Stampa for CD-WO of this example can be manufactured with the cutting equipment of drawing 11 R> 1 (b). As compared with usual CD-WO cutting equipment, the light strategy data or the identifier other than ATIP time data and the usual ATIP special information data (refer to drawing 10 R>0(a) - (d)) is added as supply data to the ATIP modulator 74, and drawing 11 (b) also modulates light strategy data or an identifier as ATIP special information in a lead-in groove field, and also, similarly functions as usual CD-WO cutting equipment.

[0029] Next, invention according to claim 9 is explained. It **, extended application of the ATIP special information fields (drawing 10 R> 0 (b) - (g)) other than the hour entry of the lead-in groove field sector of drawing 10 (a) applied only to the lead-in groove field is

carried out in this invention in addition to a lead-in groove field and a program field (refer to drawing 3 (a)), they are used, and light strategy data or an identifier is modulated and recorded on a CD-WO disk. For example, light strategy data or an identifier is recorded on PMA of drawing 3 (a), PCA, and the coldhearted news field of the inner circumference in the ATIP special information field by which extended application was carried out. A CD-WO recording device reads the above-mentioned data which decode the ATIP special information on this field, and are recorded on CD-WO from the inside.

[0030] Drawing 12 (a) is drawing for explaining an example of the CD-WO recording device used for the invention 9 of this claim 9. This CD-WO recording device Have the ATIP demodulator 82 as a demodulator 22 in drawing 1 (a) and drawing 2 (a), and it has two ATIP special information decoders field discriminator 83a, 83b for lead-in groove fields, and for lead-in groove inner circumference field 83c as a decoder 23. When above-mentioned CD-WO is set, a lead-in groove field is accessed and field discriminator 83a chooses ATIP special information decoder 83a for lead-in groove fields. It not only acquires the conventional ATIP special information, but A lead-in groove inner circumference field is also accessed, and in that case, field discriminator 83a chooses ATIP special information decoder 83c for lead-in groove inner circumference fields, and obtains light strategy data or an identifier. In addition, f0 band pass filter 81, the ATIP demodulator 82, and ATIP special information decoder 83b for lead-in groove fields are the same functions as that with which the usual recording device is equipped, and can be made to serve a double purpose.

[0031] La Stampa for CD-WO of this example can be manufactured with the cutting equipment of drawing 12 R> 2 (b). The configuration and function which the cutting equipment of drawing 12 (b) has field discriminator 84a, chooses the usual ATIP special information data (refer to drawing 10 (a) ~ (d)) in a lead-in groove field as supply data to ATIP modulator 84b to usual CD-WO cutting equipment, and choose light strategy data or an identifier in a lead-in groove inner circumference field are added. Light strategy data or an identifier is modulated as ATIP special information in a lead-in groove inner circumference field, and also, similarly it functions as usual CD-WO cutting equipment.

[0032] Next, invention according to claim 10 is explained. In an ATIP format, FM modulation is carried out and this invention records another frequency f1 on which said light strategy data or identifier is superimposed to the PURIGURUBU wobble frequency f0, and light strategy data or an identifier carries out FM modulation of f1, for example, it is recorded all over CD-WO. A CD-WO recording apparatus obtains the above-mentioned data which restore to it and decode the superposition frequency f1 of the PURIGURUBU wobble frequency f0, and are recorded on CD-WO.

[0033] Drawing 13 (a) is drawing for explaining an example of the CD-WO recording device used for invention of claim 10. This CD-WO recording device When it has the demodulator 94 which consists of f1 band-pass-filter 94a and FM demodulator 94b as a demodulator 22 in drawing 1 (a) and drawing 2 (a) and above-mentioned CD-WO was set It accesses a lead-in groove field, and it not only acquires ATIP special information by the usual approach, but f1 band-pass-filter 94a and FM demodulator 94b perform FM recovery to a carrier frequency f1, and it obtains light strategy data or an identifier from a decoder 95. Since a format of ATIP is used as a data gestalt of FM modulation, except for the point

that carrier frequencies differ, the circuitry of the conventional ATIP demodulator can be diverted to a demodulator.

[0034] La Stampa for CD-WO of this example can be manufactured with the cutting equipment of drawing 13 R> 3 (b). The function which drawing 13 (b) has FM modulator 95a and adder 95b to usual CD-WO cutting equipment, carries out FM modulation of light strategy data or the identifier, and superimposes a carrier frequency f1 on the wobble frequency f0 is added. Since a format of ATIP is used as a data gestalt of FM modulation, except for the point that carrier frequencies differ, the circuitry of the conventional ATIP modulator can be diverted to a modulator.

[Translation done.]

* NOTICES *

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3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing for explaining one example of invention according to claim 1.

[Drawing 2] It is drawing for explaining one example of invention according to claim 2.

[Drawing 3] It is drawing showing the radial cross-section configuration of CD-WO.

[Drawing 4] It is drawing for explaining an example of a CD-WO recording device.

[Drawing 5] It is drawing for explaining the radial important section sectional view of CD-WO, and the example of a CD-WO recording device.

[Drawing 6] It is an important section block diagram for explaining an example of disk original recording KATTENGU equipment.

[Drawing 7] It is drawing for explaining one example of invention according to claim 6.

[Drawing 8] It is drawing for explaining an example of the KATTENGU equipment used for invention according to claim 6.

[Drawing 9] It is drawing for explaining one example of invention according to claim 7.

[Drawing 10] It is drawing for explaining ATIP currently recorded on CD-WO.

[Drawing 11] It is drawing for explaining one example of invention according to claim 8.

[Drawing 12] It is drawing for explaining one example of invention according to claim 9.

[Drawing 13] It is drawing for explaining one example of invention according to claim 10.

[Description of Notations]

1 [— Identifier,] — CD-WO, 10 — A modulator, 11 — Light strategy data, 12 20 [— Decoder,] — A CD-WO recording device, 21 — An eight-to-fourteen modulation machine,

22 --- A demodulator, 23 24 [--- Table retrieval section.] --- A laser setter, 25 --- A laser driver, 26 --- A table, 27 30 [--- Eight-to-fourteen modulation machine,] --- A field discriminator, 31 --- Pickup, 40 --- A modulator, 51 52 [--- Adder,] --- A field discriminator, 60 --- A modulator, 61 --- A signal selector, 62 71, 81, 91 [--- An ATIP modulator 94 / --- A demodulator, 95 / --- A decoder, 96 / --- Modulator,] --- A band pass filter, 72, 82, 92 - - 73 An ATIP demodulator, 83 --- 74 An ATIP special information decoder, 84

[Translation done.]

*** NOTICES ***

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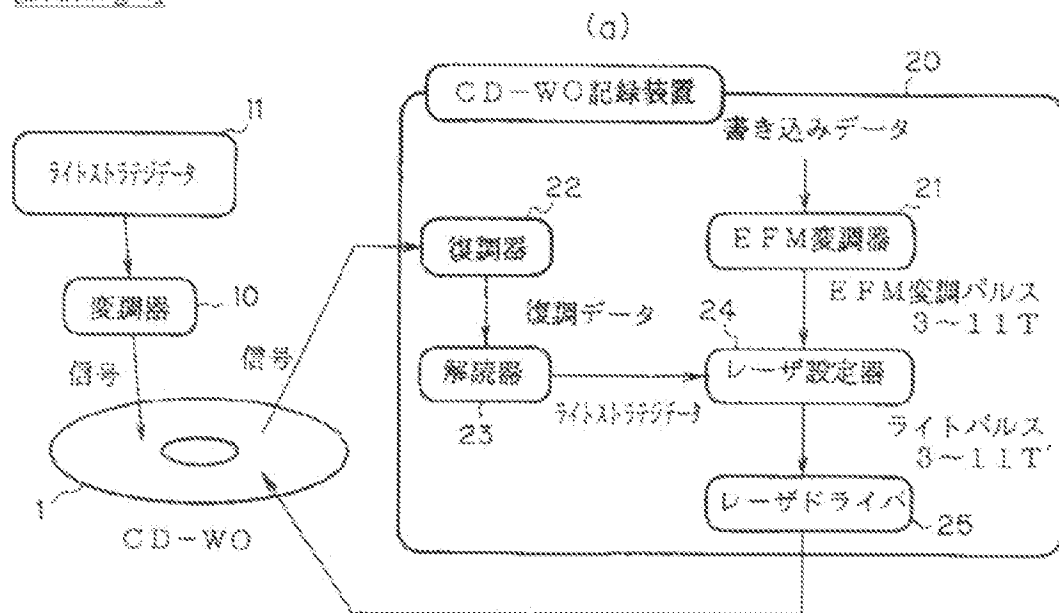
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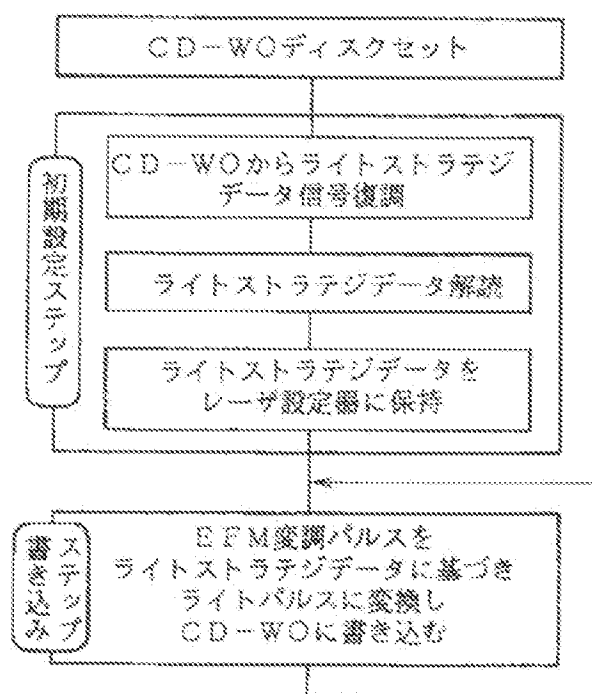
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DRAWINGS

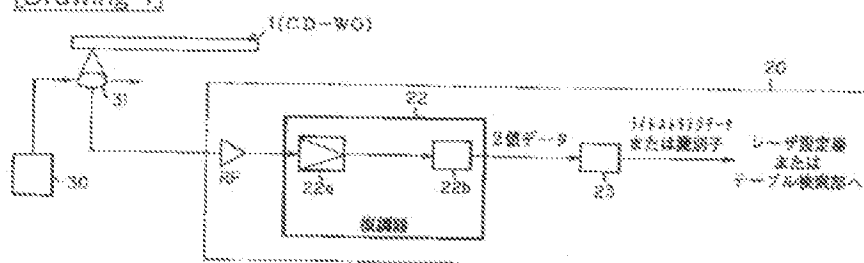
[Drawing 1]



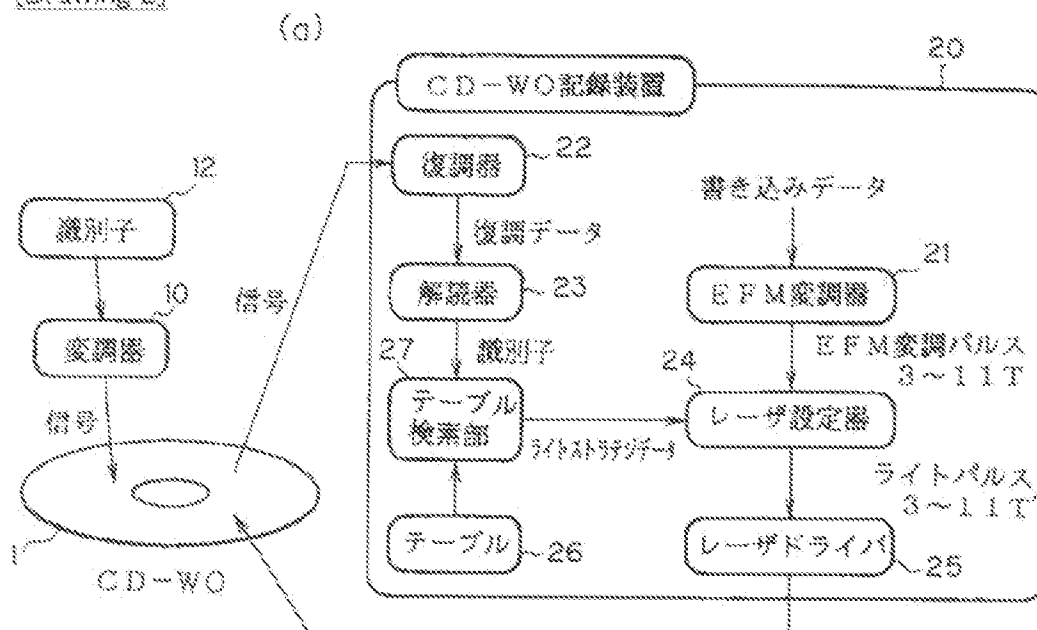
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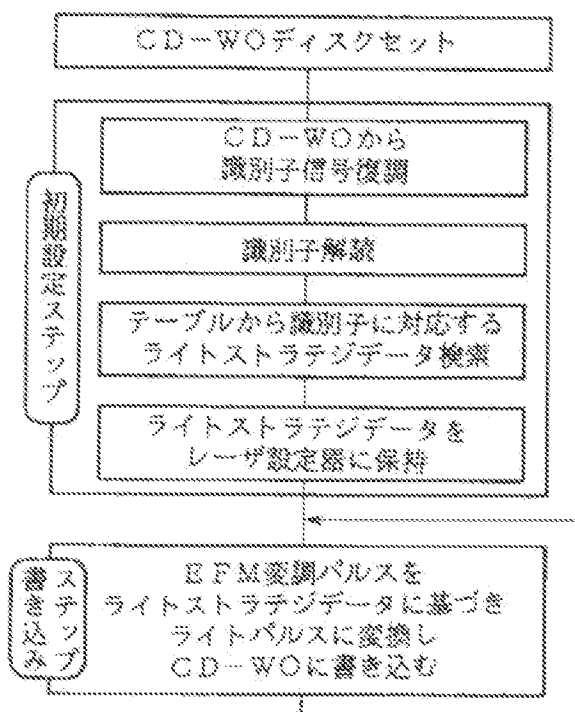
[Drawing 4]



[Drawing 2]



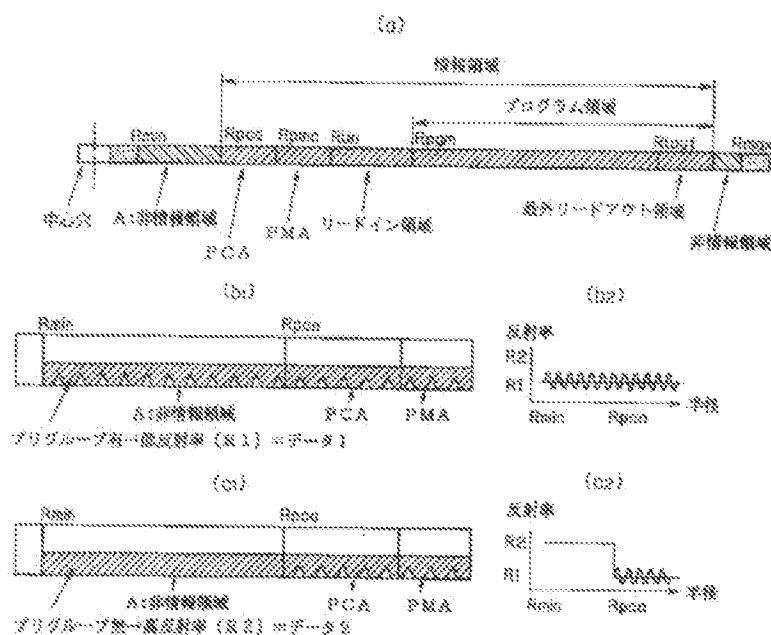
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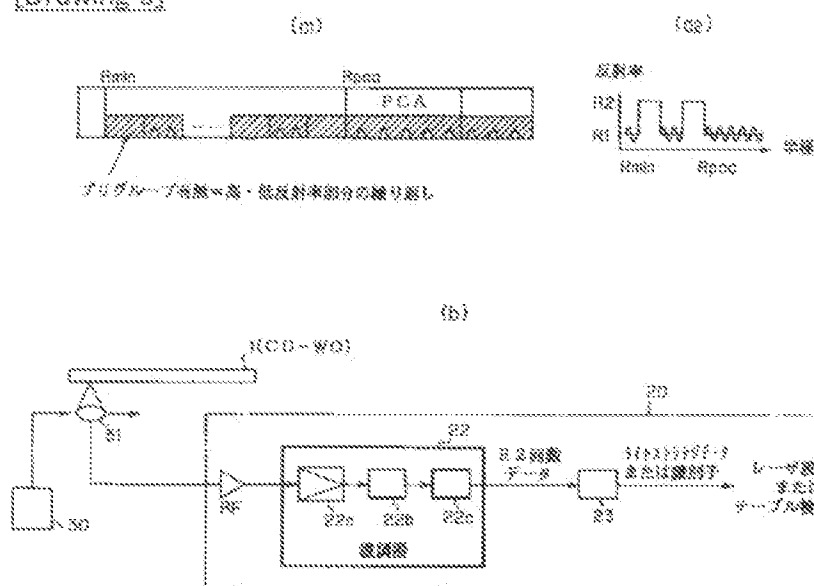
(c)

識別子フィールド	ライトストラテジフィールド
<i>Did 1</i>	<i>ws 1</i>
<i>Did 2</i>	<i>ws 2</i>
:	:
:	:

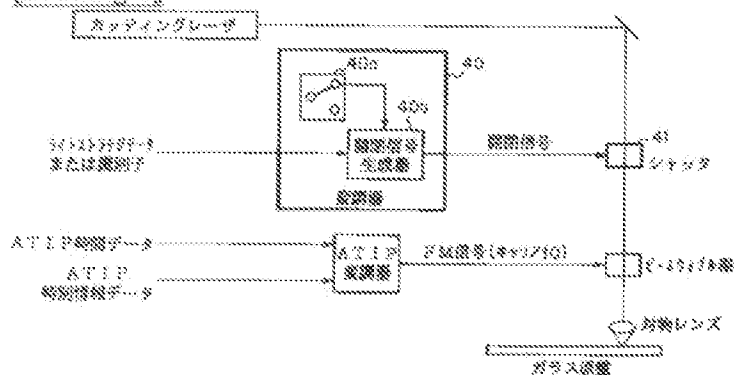
[Drawing 3]



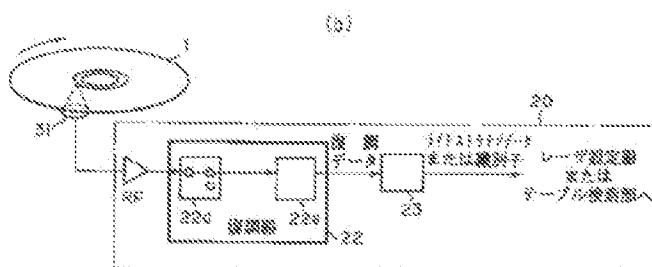
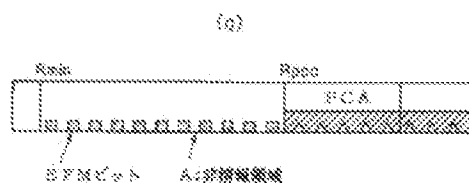
[Drawing 5]



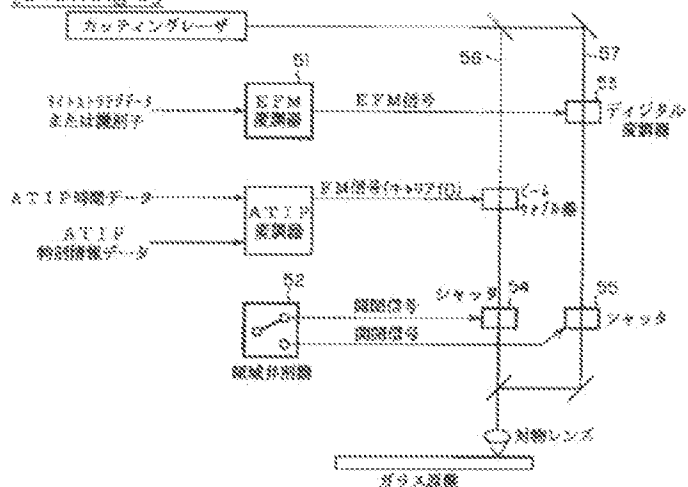
[Drawing 6]



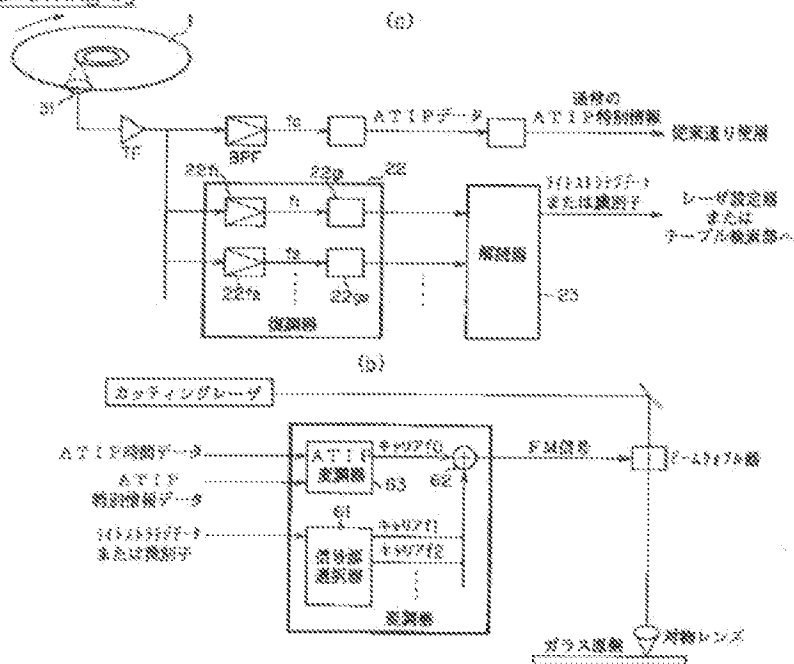
[Drawing 7]

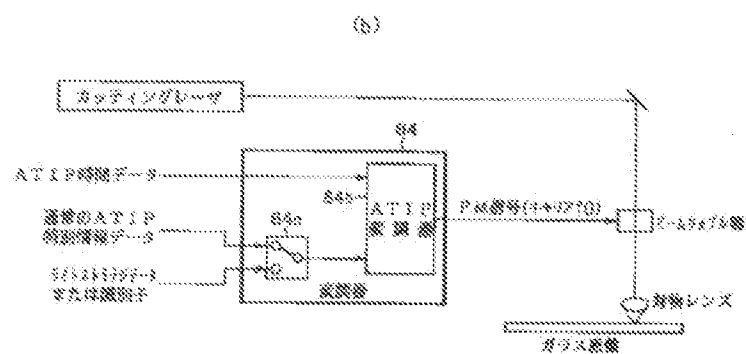
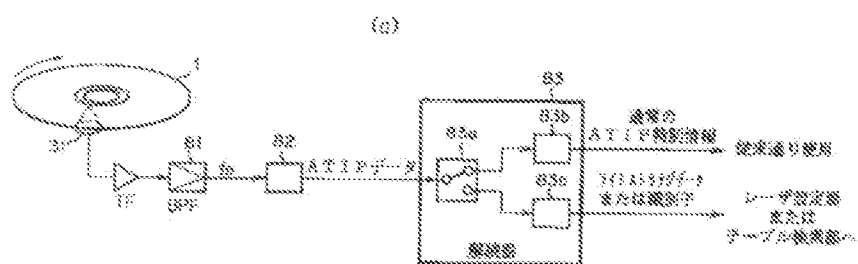


Drawing 89



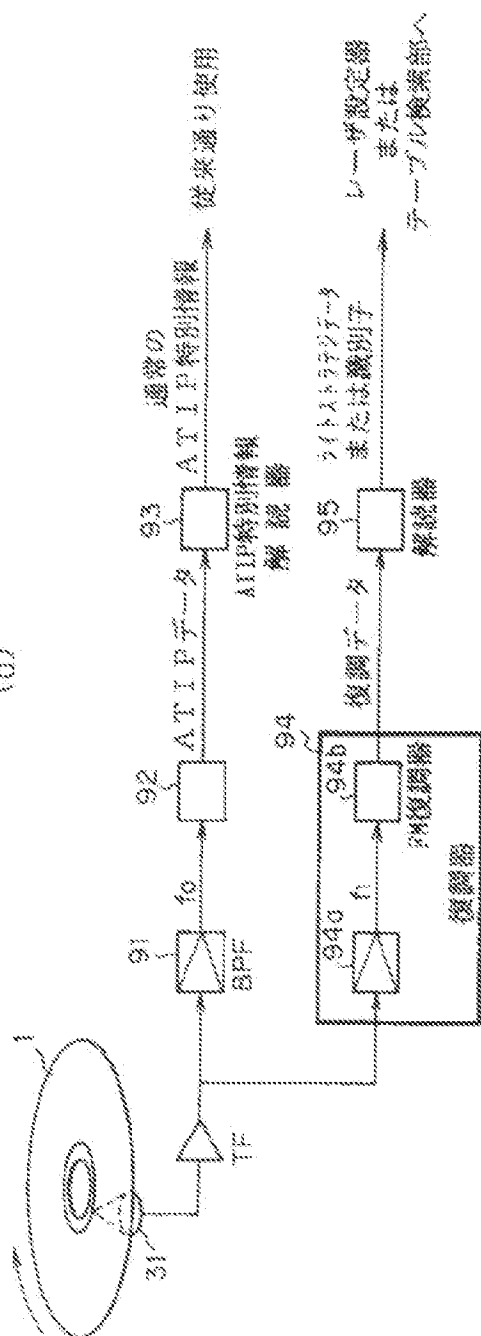
[Drawing 9]



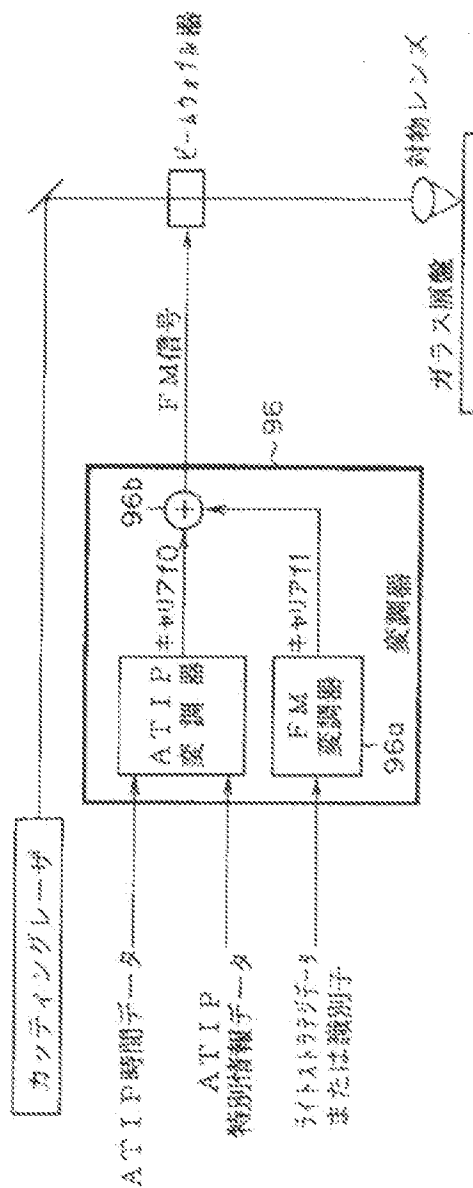


[Drawing 13]

(a)



(b)



[Translation done.]

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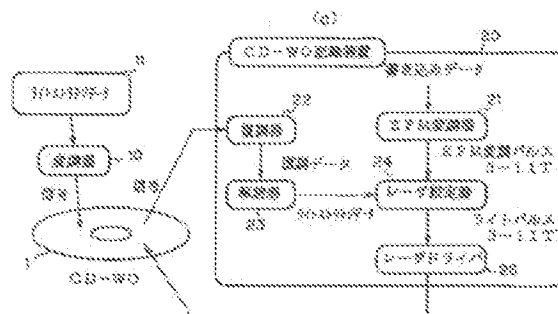
(70) 代理人 弁理士 高野 明近

(54) 【発明の名称】 追記型コンパクトディスク記録方法及び該ディスクの製造方法

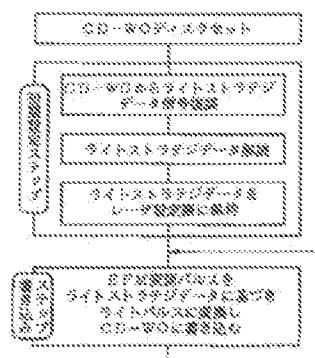
(57) 【要約】

【目的】 CD-WOとCD-WO記録装置の組み合わせにかかわらず、CD-WOに固有なライトストラテジによる書き込みを実現する。

【構成】 追記型コンパクトディスク1には、変調器10により変調されたライトストラテジデータ11の変調信号が製造時にあらかじめ記録されている。このディスク1をCD-WO記録装置20にセットすると、復調器22により前記ストラテジデータが復調され、解読器23によって解読され、レーザ設定器24に記憶される。書き込み時、該記録装置が使用する前記ディスクから読み出したライトストラテジデータで指定されるライトストラテジを用いてレーザドライバ25を制御して書き込みをする。



(a)



(b)

【特許請求の範囲】

【請求項1】 所定方法により変調されたライトストラテジデータの変調信号が製造時にあらかじめ記録されている追記型コンパクトディスクと、該ディスクから前記ライトストラテジデータを読み出すための復調器及び解読器と、B/FM変調パルスを前記ライトストラテジデータに応じたライトパルスに変換するためのレーザ設定器を有する追記型コンパクトディスク記録装置からなり、該記録装置は、該記録装置が使用する前記ディスクから読み出したライトストラテジデータで指定されるライトストラテジを用いて書き込みをすることを特徴とする追記型コンパクトディスク記録方法。

【請求項2】 所定方法により変調されたライトストラテジ識別子の変調信号が製造時にあらかじめ記録されている追記型コンパクトディスクと、該ディスクから前記識別子を読み出すための復調器及び解読器と、前記識別子と該識別子に対応するライトストラテジデータからなるテーブルと、該テーブルから前記識別子に対応するライトストラテジデータを検索する手段と、B/FM変調パルスを前記検索されたライトストラテジデータに応じたライトパルスに変換するためのレーザ設定器とを有する追記型コンパクトディスク記録装置からなり、該記録装置は、該記録装置が使用する前記ディスクから読み出した識別子に応じたライトストラテジを用いて書き込みをすることを特徴とする追記型コンパクトディスク記録方法。

【請求項3】 前記識別子として、ディスクの記録材料ごとに割り当てられた記録材料識別子を用いることを特徴とする請求項2に記載の追記型コンパクトディスク記録方法。

【請求項4】 所定の方法により変調されたライトストラテジデータ或いは識別子の変調信号を製造時にあらかじめ記録しておく追記型コンパクトディスクの製造方法において、前記ライトストラテジデータまたは識別子が、カッティング工程においてスタンバ中に記録されることを特徴とする追記型コンパクトディスクの製造方法。

【請求項5】 所定の方法により変調されたライトストラテジデータ或いは識別子の変調信号を製造時にあらかじめ記録しておく追記型コンパクトディスクの製造方法において、前記ライトストラテジデータまたは識別子を、反射光量分布パターンで変調してディスクの非情報領域に記録することを特徴とする追記型コンパクトディスクの製造方法。

【請求項6】 所定の方法により変調されたライトストラテジデータ或いは識別子の変調信号を製造時にあらかじめ記録しておく追記型コンパクトディスクの製造方法において、前記ライトストラテジデータまたは識別子を、B/FM変調されたビットとしてディスクの非情報領域に記録することを特徴とする追記型コンパクトディスク

クの製造方法。

【請求項7】 所定の方法により変調されたライトストラテジデータ或いは識別子の変調信号を製造時にあらかじめ記録しておく追記型コンパクトディスクの製造方法において、前記ライトストラテジデータまたは識別子を、プリグループウォブル周波数に重畳される周波数パターンで変調・記録することを特徴とする追記型コンパクトディスクの製造方法。

【請求項8】 所定の方法により変調されたライトストラテジデータ或いは識別子の変調信号を製造時にあらかじめ記録しておく追記型コンパクトディスクの製造方法において、前記ライトストラテジデータまたは識別子を、リードイン領域のATIP特別情報として変調・記録することを特徴とする追記型コンパクトディスクの製造方法。

【請求項9】 所定の方法により変調されたライトストラテジデータ或いは識別子の変調信号を製造時にあらかじめ記録しておく追記型コンパクトディスクの製造方法において、前記ライトストラテジデータまたは識別子を、リードイン領域・プログラム領域以外に拡張適用されたATIP特別情報として変調・記録することを特徴とする追記型コンパクトディスクの製造方法。

【請求項10】 所定の方法により変調されたライトストラテジデータ或いは識別子の変調信号を製造時にあらかじめ記録しておく追記型コンパクトディスクの製造方法において、前記ライトストラテジデータまたは識別子を、プリグループウォブル周波数に重畳される周波数をATIPフォーマットでFM変調して記録することを特徴とする追記型コンパクトディスクの製造方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、追記型コンパクトディスクのデータ記録方法及び該記録方法の実施に使用して好適な追記型コンパクトディスクの製造方法に関する。

【0002】

【従来の技術】 追記型光ディスクは、ユーザ側で追加記録できるディスクで、寿命が長い、誤って消す恐れがない、記録した信号の信頼性が高い、容量が大きい等の特徴を有し、容量が大きいことを生かして、追加記録することにより、一見、書き換えたかのように情報を管理することができる。而して、追記型コンパクトディスク

(以下、CD-WOと略記)のデータ書き込みでは、B/FM変調の3~11T(Tは1B/FMクロック)ビットを形成するが、3~11Tのライトパルスをそのまま照射すると再生信号が劣化する(ビット歪みが発生するなどの理由による)ため、3~11Tに対し適当に補償したライトパルス(この補償手段をライトストラテジと呼ぶ)を照射してビットを形成し、良好な再生信号を得るようにしている。

【0003】 ライトストラテジの内容は基本的にCD-

WOの記録材料ごとに異なり、適切なライトストラテジで記録しないと良好な再生信号が得られない。現在、市場に流通しているCD-WOに使われている記録材料はシアニン色素とフクロシアニン色素に大別される。これら二者に対しては上述の理由により、別個のライトストラテジで記録することが必要である。また、大別してシアニン色素とフクロシアニン色素があるといえども各ディスクに使われている記録材料の組成が異なるので、厳密に言えば、各CD-WOごとに上述のライトストラテジをそれぞれ別個にすることが望ましい。

【0004】

【発明が解決しようとする課題】 上述のような背景にもかかわらず、現行のCD-WO記録装置はディスク種類はおろか記録材料の識別すらできず、そのため、ライトストラテジを全く行っていないか、適当に選んだライトストラテジを適用する程度にとどまっている。このため、A社のCD-WOはB社のCD-WO記録装置で書き込むと良好な再生信号が得られるが、C社のCD-WO記録装置で書き込むと再生信号に問題がある。しかし、D社のCD-WOを使った場合には再生信号品質の

関係が逆転する、などの現象が発生している。

【0005】 本発明は、上述のごとき実情に鑑みてなされたもので、CD-WOとCD-WO記録装置の組み合わせにかかわらず、CD-WOに固有なライトストラテジによる書き込みを実現するための、CD-WO記録方法、CD-WOを簡単に大量製造するための方法、CD-WOに固有なライトストラテジで書き込むための方法を提供することにある。

【0006】

【課題を解決するための手段】 本発明は、上記課題を解決するために、(1) 所定方法により変調されたライトストラテジデータの変調信号が製造時にあらかじめ記録されている追記型コンパクトディスクと、該ディスクから前記ライトストラテジデータを読み出すための復調器及び解読器と、EFM変調パルスを前記ライトストラテジデータに応じたライトパルスに変換するためのレーザ設定器を有する追記型コンパクトディスク記録装置からなり、該記録装置は、該記録装置が使用する前記ディスクから読み出したライトストラテジデータで指定されるライトストラテジを用いて書き込みをすること、或いは、

(2) 所定方法により変調されたライトストラテジ識別子の変調信号が製造時にあらかじめ記録されている追記型コンパクトディスクと、該ディスクから前記識別子を読み出すための復調器及び解読器と、前記識別子とそれに対応するライトストラテジデータからなるテーブルと、該テーブルから前記識別子に対応するライトストラテジデータを検索する手段と、EFM変調パルスを前記検索されたライトストラテジデータに応じたライトパルスに変換するためのレーザ設定器を有する追記型コンパクトディスク記録装置からなり、該記録装置は、該記録

装置が使用する前記ディスクから読み出した識別子に応じたライトストラテジを用いて書き込みをすることを特徴とし、更には、(3) 前記(2)において、前記識別子として、ディスクの記録材料ごとに割り当てられた記録材料識別子を用いることを特徴としたものである。更には、所定の方法により変調されたライトストラテジデータ或いは識別子の変調信号を製造時にあらかじめ記録しておく追記型コンパクトディスクの製造方法において、(4) 前記ライトストラテジデータまたは識別子が、カッティング工程においてスタンパ中に記録されること、或いは、(5) 前記ライトストラテジデータまたは識別子を、反射光量分布パターンで変調してディスクの非情報領域に記録すること、或いは、(6) 前記ライトストラテジデータまたは識別子を、EFM変調されたビットとしてディスクの非情報領域に記録すること、或いは、(7) 前記ライトストラテジデータまたは識別子を、ブリグリーブウォブル周波数に重畳される周波数パターンで変調・記録すること、或いは、(8) 前記ライトストラテジデータまたは識別子を、リードイン領域のATIP特別情報として変調・記録すること、或いは、(9) 前記ライトストラテジデータまたは識別子を、リードイン領域・プログラム領域以外に拡張適用されたATIP特別情報として変調・記録すること、或いは、(10) 前記ライトストラテジデータまたは識別子を、ブリグリーブウォブル周波数に重畳される周波数をATIPフォーマットでFM変調し記録することを特徴としたものである。

【0007】

【作用】

(1) 請求項1の発明においては、CD-WOにライトストラテジデータを予め記録して置き、使用するCD-WOごとに該ディスクから読み出したライトストラテジデータで書き込むようにし、CD-WOとCD-WO記録装置の組み合わせによらず適切な書き込み、再生ができるようにする。

(2) 請求項2の発明においては、CD-WOにライトストラテジ識別子を予め記録して置き、使用するCD-WOごとに該ディスクから読み出した識別子に対応するライトストラテジデータで書き込みを行うようにし、CD-WOとCD-WO記録装置の組み合わせによらず適切な書き込み、再生ができるようにする。

(3) 請求項3の発明においては、少数(ディスク個々の識別子と比較して)で済む記録材料識別子をCD-WOに記録することで、CD-WOとCD-WO記録装置の組み合わせによらず、記録材料に応じたライトストラテジで書き込みができ、実用上十分な品質の再生信号を得る。

(4) 請求項4の発明においては、カッティング工程において、CD-WOのスタンパ中にライトストラテジデータまたは識別子を記録するようにし、個々のCD-W

0に記録作業を施すことなく、ライトストラテジデータまたは識別子が記録されたCD-WOを容易に大量に製造可能とする。

〔5〕請求項5の発明においては、非情報領域を利用するようにし、情報領域に制約を与えることなくライトストラテジデータまたは識別子をCD-WOに記録可能とする。そのうえ、反射光量を利用することにより、CD-WO記録装置の復調器とCD-WOスタンパ製造のためのカッティング装置の変調器を簡単な構成で実現する。

【0008】〔6〕請求項6の発明においては、非情報領域を利用するようにし、情報領域に制約を与えることなくライトストラテジデータまたは識別子をCD-WOに記録可能とする。そのうえ、EFM変調を利用することにより、CD-WO記録装置の復調器をあらかじめ記録装置に備わっているEFM復調器と兼用し、装置規模を抑える。

〔7〕請求項7の発明においては、ブリググループウォブル周波数への重畳周波数を利用し、ディスク上に余分なビット・グループなどを形成することなく、また、本来のウォブル周波数1.に制約を与えることなく、ライト

ストラテジデータまたは識別子をCD-WOに記録する。

〔8〕請求項8の発明においては、リードイン領域の未使用ATIP特別情報フィールドを利用し、従来のATIP特別情報解説器にライトストラテジデータまたは識別子の解説機能を追加するだけで、CD-WO記録装置を実現する。そのうえ、従来のATIP変調器にライトストラテジデータまたは識別子を供給するだけで、CD-WOスタンパ製造のためのカッティング装置を実現する。

〔9〕請求項9の発明においては、リードイン領域・プログラム領域以外に拡張適用されたATIP特別情報フィールドを利用し、CD-WO記録装置の復調器を従来のATIP復調器と兼用して装置規模を抑える。そのうえ、従来のATIP変調器へのデータ供給形態を若干変更するだけで、CD-WOスタンパ製造のためのカッティング装置を実現する。

〔10〕請求項10の発明においては、ブリググループウォブル周波数への重畳周波数をATIPフォーマットを利用してFM変調利用し、CD-WO記録装置の復調器回路に従来のATIP復調器回路構成を利用可能とする。そのうえ、CD-WOスタンパ製造のためのカッティング装置の変調器回路構成もATIP変調器回路を利用可能とする。

【0009】

【実施例】図1は、請求項1に記載の発明の一実施例を説明するための構成図（図1（a））、及び、その動作説明をするためのフロー図（図1（b））で、図中、1はCD-WO（油圧型コンパクトディスク）、10は変

調器、11はライトストラテジデータ、20はCD-WO記録装置で、該CD-WO記録装置20は、EFM変調器21、復調器22、解説器23、レーザ設定器24、レーザドライバ25等から成り、CD-WO1の製造時に、書き込みに使用するライトストラテジデータ11を変調器10により変調し、その変調信号をあらかじめCD-WO1上に記録しておく。CD-WO記録装置20は、従来から備わっているEFM変調器21とレーザドライバ25に加え、復調器22、解説器23、レーザ設定器24から構成されている。CD-WO記録装置20は、CD-WO1がセットされた時点で、復調器22によりディスク1上の記録信号を復調してデータ化し、解説器23により該復調データを解説してライトストラテジデータを得、解説したライトストラテジデータをレーザ設定器24の内部に保持する。

【0010】以上が初期設定ステップであり、この後に書き込みステップに移行する。書き込みステップでは、レーザ設定器24の内部に設定されているライトストラテジデータに基づき、入力EFM変調パルス3〜11Tを適切なライトパルス3〜11T'に変換してレーザドライバ25に出力する。

【0011】図2は、請求項2に記載の発明の一実施例を説明するための構成図（図2（a））、及び、その動作説明をするためのフロー図（図2（b））、及び、テーブルの構成例（図2（c））を示し、図中、12は識別子、36はテーブル、27はテーブル検索部で、その他、図1に示した実施例と同様の作用をする部分には、図1の場合と同一の参照番号が付してある。而して、この発明は、CD-WO1の製造時に、図1に示した書き込みに使用するライトストラテジデータ11を記録する代わりに、ライトストラテジデータの識別子12を変調し、その変調信号をあらかじめCD-WO1上に記録しておくものである。識別子12としては、たとえば、図2（c）に示すように、同一種類のCD-WOに対してユニークに割り当てられたディスク識別子（A社のBタイプはD161、C社のDタイプはD162など）がある。CD-WO記録装置20は、従来から備わっているEFM変調器21とレーザドライバ25に加え、復調器22、解説器23、ライトストラテジデータテーブル26、テーブル検索部27、レーザ設定器24から構成されている。CD-WO記録装置20は、CD-WO1がセットされた時点で復調器22によりディスク1の記録信号を復調してデータ化し、解説器23により該復調データを解説して識別子を得、テーブル検索部27によりテーブル26を検索して該識別子に対応するライトストラテジデータを取得し、解説したライトストラテジデータをレーザ設定器24の内部に保持する。

【0012】以上が初期設定ステップであり、この後に書き込みステップに移行する。書き込みステップでは、レーザ設定器24の内部に設定されているライトストラ

デジデータに基づき、入力EFM変調パルス3〜11Tを適切なライトパルス3〜11Tに変換してレーザドライバ25に出力する。

【0013】請求項3に記載の発明は、前記識別子12として、同一記録材料に対してユニークに割り当てられた記録材料識別子（たとえば、シアニン色素はMid1、フタロシアニン色素はMid2など）を用いて、特定の記録材料に固有なライトストラテジでの書き込みを行うようにしたもので、このようにすると、記録材料識別子の種類はディスク個々に割り当てられたディスク識別子の種類と比較してはるかに少数で済む。

【0014】請求項4に記載の発明は、ライトストラテジデータ11または識別子12をCD-WO1のカッティング工程において、CD-WOスタンバ上に記録するようにし、これにより、スタンバから基板を大量複製して記録材料を製造し、前述のCD-WO1を製造するようにしたものである。

【0015】請求項5に記載の発明は、前述のライトストラテジデータ11または識別子12を、反射光量分布パターンにより変調して、図3(a)のCD-WOディスク断面図に示す、CD-WO上の非情報領域A中に記録し、CD-WO記録装置20により、該領域の反射光量信号からCD-WOに記録されている上記データを読み出すようにしたものである。図3(b)、(c)は、それぞれ図3(a)に示した非情報領域A部近傍の拡大図で、図3(b)に示すCD-WOのようにブリググループがある場合は、反射光量レベルが低反射率R1（図3(b)）であり、図3(c)に示すCD-WOのように、ブリググループがない場合は、反射光量レベルが高反射率R2（図3(c)）で、これらを2値データに対応させ、PCA内側の半径R_{ain}からR_{pea}のブリググループの有無によって2値データを記録する。

【0016】図4に示したCD-WO記録装置20は、図1(a)、図2(a)における復調器22として、ローパスフィルタ22aとRF2値化器22bを有し、上述したCD-WO1がセットされた時点で、領域弁別器30によってピックアップ31を半径R_{ain}からR_{pea}までスキャンさせ、そこから得られる反射光量信号をローパスフィルタ22aにかけた上で2値化し、この2値化データを復調し、解読器23によりライトストラテジデータまたは識別子を解読する。以降の動作は図1又は図2に示した実施例と同じである。

【0017】図5(a)は、CD-WO1の半径R_{ain}からR_{pea}の領域において、ディスク半径方向におけるブリググループ有無を複数回繰り返して設け、この回数を多量情報を対応させて記録するようにしたものである。反射率変動の回数（図5(a)）を、図5(b)のCD-WO記録装置20で検出する。図5(b)に示したCD-WO記録装置20は、図1(a)、図2(a)における復調器22としてローパスフィルタ22aとRF

2値化器22bとR2計数器22cを有し、上述したCD-WO1がセットされた時点で、領域弁別器30によってピックアップ31を半径R_{ain}からR_{pea}までスキャンさせ、そこから得られる反射光量信号をローパスフィルタ22aにかけた上で2値化してからR2回数データを復調し、解読器23によりライトストラテジデータまたは識別子を解読する。以降の動作図1又は図2に示した実施例と同じである。

【0018】上記実施例のCD-WO用スタンバは、図6に示すカッティング装置で製造することができる。図6は通常のCD-WOカッティング装置に、領域弁別器40aと開閉信号生成器40bからなる変調器40とシャッタ41が追加されたものである。このカッティング装置は、領域弁別器40aによりCD-WOの半径R_{ain}からR_{pea}の領域においてのみ、ライトストラテジデータまたは識別子である2値データ（図3(b)、(c)のディスク製造の場合）またはR2回数データ（図5(a)のディスク製造の場合）に応じて生成した開閉信号をシャッタ41に供給し、それ以外の領域においてはシャッタ41を開けて通常のCD-WOカッティング装置として機能する。

【0019】図7は、請求項6に記載した発明の実施例を説明するための図で、この実施例は、前記ライトストラテジデータ11または識別子12を、図7(a)に示すように、EFM変調ビットとしてCD-WO上の非情報領域A中に記録するようにしたもので、CD-WO記録装置20は、図7(b)に示すように、該非情報領域のEFM信号からCD-WOに記録されている上記データを読み出す。

【0020】図7に示した実施例では、図7(a)に示したように、半径R_{ain}からR_{pea}の非情報領域においてEFMビットを形成し、このビットにはライトストラテジデータまたは識別子がEFM変調で記録されており、図7(b)に示したCD-WO記録装置20は、領域弁別器22dとEFM復調器22eからなる復調器22を有するほかは、図1(a)または図2(a)と同じ構成となっている。CD-WO記録装置20は上述したCD-WO1がセットされた時点で、非情報領域Aから得られるEFM信号を復調し、それを解読することでCD-WO1に記録されているライトストラテジデータ又は識別子情報を得る。EFM信号復調器22eは情報領域に書き込んだビット再生に使用するものと兼用でき、領域弁別器22dが非情報領域か情報領域かを識別し、前者であればライトストラテジデータ11または識別子12として、その復調データを解読してライトストラテジデータまたは識別子を得、後者であれば通常のデータであるとして処理する。

【0021】上記CD-WO用のスタンバは、図8のカッティング装置で製造することができる。図8のカッティング装置は、通常のCD-WOカッティング装置に対

し、EFM変調器51と領域弁別器52からなる変調器とシャッタ53～55が追加されたもので、領域弁別器52によりCD-WOの半径R_{min}からR_{oca}を識別し、その領域においてはシャッタ54・55をそれぞれ開・閉させ、EFM変調器51側のビーム57を選択して、ライトストラテジデータまたは識別子をEFMビットとしてカッティングし、それ以外の領域においてはシャッタ54・55をそれぞれ開・閉させ、ATIP変調器側のビーム56を選択して通常のCD-WOカッティング装置として機能する。

【0022】次に、請求項7に記載の発明について説明する。周知のように、CD-WO1はディスク上に半径方向にウォブリング（蛇行）したブリググループを有する。ウォブリング周波数は22.05KHz（以下、 f_0 と略記）である。本発明においては、前記ライトストラテジデータまたは識別子を、このブリググループウォブル周波数に重畳する周波数パターンで変調・記録する。CD-WO記録装置20は、ブリググループのウォブル周波数に重畳されている周波数パターンからCD-WOに記録されている上記ライトストラテジデータ又は識別子データを読み出す。実施例として、ブリググループウォブリング周波数 f_0 に f_1 、 f_2 、 \dots が重畳されており、ライトストラテジデータまたは識別子を重畳する周波数組み合わせパターンとして変調し、CD-WO上に記録する。たとえば、情報Aに対しては f_1 を重ねし、情報Bに対しては f_2 を重ねするなどである。

【0023】図9（a）は、この請求項7の発明に使用するCD-WO記録装置の一例を説明するための図で、このCD-WO記録装置は、図1（a）、図2（a）における復調器22として22 f_1 、22 f_2 、 \dots のバンドパスフィルタとその検出器22 g_1 、22 g_2 、 \dots を有し、上述のCD-WO1がセットされた時点で、 f_1 、 f_2 、 \dots をそれぞれのバンドパスフィルタ22 f_1 、22 f_2 、 \dots によって弁別して検出器22 g_1 、22 g_2 、 \dots により検出信号を生成し、解読器23により重畳周波数パターンを解読してライトストラテジデータまたは識別子を得る。

【0024】この実施例のCD-WO用スタンプは、図9（b）のカッティング装置で製造することができる。図9（b）は、通常のCD-WOカッティング装置に対し、信号源選択器61と加算器62が加わったものである。信号源選択器61はライトストラテジデータまたは識別子に応じたパターンの周波数 f_1 、 f_2 、 \dots 信号を選択出力する。この出力とATIP変調器63から出力される f_0 を加算器62により合成してウォブリング周波数としてビームウォブル器に供給する。

【0025】請求項8に記載の発明は、ライトストラテジデータまたは識別子を、リードイン領域のATIP特別情報としてCD-WO上に変調・記録するもので、CD-WO記録装置は、リードイン領域のATIP特別情

報を解読し、その中からCD-WOに記録されている上記ライトストラテジデータ又は識別子を読み出す。CD-WOのブリググループにはウォブリング周波数 f_0 をキャリア周波数とするFM変調により42ビットデータが記録されている。これをATIPと称し、ビット5から28の24ビットに通常はディスク上プログラム領域セクタの時間情報が含まれている。ビット5、13、21をゼロ以外とすることでATIPは上記以外の特別情報を表わすことができる。これら特別情報はリードイン領域において使用され、それぞれリードイン領域セクタの時間情報（図10（a）参照；ただし、このフィールドのみリードイン領域よりもさらに内周の領域にも適用される）や、記録パワー／アプリケーションコード（図10（b）参照）、リードイン領域開始時間（図10（c）参照）、最外リードアウト領域開始時間（図10（d）参照）を表わし、CD-WO記録装置はCD-WOがセットされた時点でこれらの情報を獲得して、データ書き込みに備える。

【0026】上述のATIP特別情報のうち用途が定まっていなかったフィールドを用いて、ライトストラテジデータまたは識別子を記録する。ATIP特別情報のビット5、13、21が、それぞれ0・0・1（図10（e）参照）、0・1・0（図10（f）参照）、0・1・1（図10（g）参照）となる特別情報フィールドのビット5、13、21以外、または、記録パワー／ディスクアプリケーション特別情報フィールドのビット9から12（図10（h）参照）、ビット14＝1に対するビット15から20、ビット22から28（図10（i）参照）のいずれかもしくは組み合わせを利用して、CD-WOディスク上にライトストラテジデータまたは識別子を記録する。

【0027】図11（a）は、この請求項8の発明に使用するCD-WO記録装置の一例を説明するための図で、このCD-WO記録装置は、図1（a）、図2（a）における復調器22としてATIP復調器72、解読器23としてATIP特別情報解読器73を有し、上述のCD-WO1がセットされた時点で、リードイン領域のトラッキングエラー信号を f_0 バンドパスフィルタ（BPF）71を通してATIP復調器72により復調し、ATIP特別情報解読器73により通常のATIP特別情報（図10（a）～（d）参照）を得、さらに、ライトストラテジデータまたは識別子（図10（e）～（i）参照）を得る。なお、 f_0 バンドパスフィルタ71、ATIP復調器72は通常の記録装置に備えられているものと同一機能であり、兼用することができる。

【0028】本実施例のCD-WO用スタンプは、図11（b）のカッティング装置で製造することができる。図11（b）は通常のCD-WOカッティング装置と比較し、ATIP変調器74への供給データとして、AT

IP時間データと通常のATIP特別情報データ(図10(a)~(d)参照)の他に、ライトストラテジデータまたは識別子が加わったものであり、リードイン領域でライトストラテジデータまたは識別子もATIP特別情報として変調するほかは、通常のCD-WOカッティング装置と同じく機能する。

【0029】次に、請求項9に記載の発明について説明する。而して、この発明においては、リードイン領域のみに適用されている図10(a)のリードイン領域セクタの時間情報以外のATIP特別情報フィールド(図10(b)~(g))をリードイン領域・プログラム領域以外(図3(a)参照)に拡張適用し、それらを用いて、ライトストラテジデータまたは識別子をCD-WOディスク上に変調・記録する。例えば、図3(a)のPMA、PCAおよびその内周の非情報領域に拡張適用されたATIP特別情報フィールドにライトストラテジデータまたは識別子を記録する。CD-WO記録装置は、該領域のATIP特別情報を解読してその中からCD-WOに記録されている上記データを読み出す。

【0030】図12(a)は、この請求項9の発明9に使用するCD-WO記録装置の一例を説明するための図で、このCD-WO記録装置は、図1(a)、図2

(a)における復調器22としてATIP復調器82、解読器23として領域弁別器83aとリードイン領域用83b及びリードイン内周領域83c用の2つのATIP特別情報解読器を有し、上述のCD-WOがセットされた時点で、リードイン領域をアクセスし領域弁別器83aがリードイン領域用ATIP特別情報解読器83aを選択して従来のATIP特別情報を得るだけでなく、リードイン内周領域もアクセスし、その場合は、領域弁別器83aがリードイン内周領域用ATIP特別情報解読器83cを選択してライトストラテジデータまたは識別子を得る。なお、 f_1 バンドパスフィルタ81、ATIP復調器82、リードイン領域用ATIP特別情報解読器83bは通常の記録装置に備えられているものと同一機能であり兼用することができる。

【0031】本実施例のCD-WO用スタンバは、図12(b)のカッティング装置で製造することができる。図12(b)のカッティング装置は通常のCD-WOカッティング装置に対し、領域弁別器84aを有し、ATIP変調器84bへの供給データとして、リードイン領域においては通常のATIP特別情報データ(図10(a)~(d)参照)を選択し、リードイン内周領域においてはライトストラテジデータまたは識別子を選択する構成及び機能が加わったものである。リードイン内周領域でライトストラテジデータまたは識別子をATIP特別情報として変調するほかは、通常のCD-WOカッティング装置と同じく機能する。

【0032】次に、請求項10に記載の発明について説明する。この発明は曲記ライトストラテジデータまたは

識別子を、プリグループウォブル周波数 f_1 へ重畳される別周波数 f_2 をATIPフォーマットでFM変調して記録するもので、例えば、ライトストラテジデータまたは識別子が、 f_2 をFM変調してCD-WO全面に記録される。CD-WO記録装置は、プリグループウォブル周波数 f_1 の重畳周波数 f_2 を復調・解読してCD-WOに記録されている上記データを得る。

【0033】図13(a)は、請求項10の発明に使用するCD-WO記録装置の一例を説明するための図で、このCD-WO記録装置は、図1(a)、図2(a)における復調器22として f_1 バンドパスフィルタ94aとFM復調器94bとから成る復調器94を有し、上述のCD-WOがセットされた時点で、リードイン領域をアクセスし、通常の方法によりATIP特別情報を得るだけでなく、 f_1 バンドパスフィルタ94aとFM復調器94bによりキャリア周波数 f_2 に対するFM復調を行い、解読器95からライトストラテジデータまたは識別子を得る。FM変調のデータ形態としてATIPのフォーマットを利用するので、キャリア周波数が異なる点を除き、復調器には従来のATIP復調器の回路構成を転用することができる。

【0034】本実施例のCD-WO用スタンバは、図13(b)のカッティング装置で製造することができる。図13(b)は通常のCD-WOカッティング装置に対し、FM変調器95aと加算器95bを有し、ライトストラテジデータまたは識別子をFM変調してウォブル周波数 f_1 にキャリア周波数 f_2 を重畳する機能が加わったものである。FM変調のデータ形態としてATIPのフォーマットを利用するので、キャリア周波数が異なる点を除き、変調器には従来のATIP変調器の回路構成を転用することができる。

【0035】

【発明の効果】

(1) 請求項1に対応する効果：CD-WO記録装置は、使用するCD-WOごとにディスクから読み出したライトストラテジデータで書き込みを行うので、CD-WOとCD-WO記録装置の組み合わせによらず適切な書き込みができ、良好な再生信号が得られる。

(2) 請求項2に対応する効果：CD-WO記録装置は、識別子とライトストラテジデータのテーブルを有しており、使用するCD-WOごとにディスクから読み出した識別子に対応するライトストラテジデータで書き込みを行うので、CD-WOとCD-WO記録装置の組み合わせによらず適切な書き込みが良好な再生信号が得られる。そのうえ、一般的に、識別子はライトストラテジデータより情報量が少なくて済むメリットがある。

(3) 請求項3に対応する効果：ディスク個々の識別子と比較して少数で済む記録材料識別子をCD-WOに記録することで、CD-WOとCD-WO記録装置の組み合わせによらず、記録材料に依りかライトストラテジデ

一タで書き込みができ、実用上十分な品質の再生信号が得られる。

(4) 請求項4に対応する効果：カッティング工程において、CD-WOのスタンバ中にライトストラテジデータまたは識別子が記録されるので、個々のCD-WOに記録作業を施すことなく、ライトストラテジデータまたは識別子が記録されたCD-WOを容易に大量に製造することができる。

(5) 請求項5に対応する効果：非情報領域を利用するので、請求項1乃至3の作用・効果に加え、情報領域に制約を与えることなく、ライトストラテジデータまたは識別子をCD-WOに記録することができる。そのうえ、反射光量を利用するので、CD-WO記録装置の復調器とCD-WOスタンバ製造のためのカッティング装置の変調器を簡単な構成で実現することができる。

(6) 請求項6に対応する効果：非情報領域を利用するので、請求項1乃至3の作用・効果に加え、情報領域に制約を与えることなくライトストラテジデータまたは識別子をCD-WOに記録することができる。そのうえ、EFM変調を利用するので、CD-WO記録装置の復調器をあらかじめ記録装置に備わっているEFM復調器と兼用し、装置規模を抑えることができる。

(7) 請求項7に対応する効果：ブリグルーブウォブル周波数への重畳周波数を利用するので、請求項1乃至3の作用・効果に加え、ディスク上に余分なビット・グループなどを形成することなく、また、本来のウォブル周波数に制約を与えることなくライトストラテジデータまたは識別子をCD-WOに記録することができる。

(8) 請求項8に対応する効果：リードイン領域の未使用ATIP特別情報フィールドを利用するので、請求項1乃至3の作用・効果に加え、従来のATIP特別情報解説器にライトストラテジデータまたは識別子の解説機能を追加するだけで、CD-WO記録装置を実現することができる。そのうえ、従来のATIP変調器にライトストラテジデータまたは識別子を供給するだけでCD-WOスタンバ製造のためのカッティング装置を実現することができる。

(9) 請求項9に対応する効果：リードイン領域・プログラム領域以外に拡張適用されたATIP情報フィールドを利用するので、請求項1乃至3の作用・効果に加え、CD-WO記録装置の復調器を従来のATIP復調器と兼用して装置規模を抑えることができる。そのうえ、従来のATIP変調器へのデータ供給形態を若干変更するだけで、CD-WOスタンバ製造のためのカッティング装置を実現することができる。

(10) 請求項10に対応する効果：ブリグルーブウォ

ブル周波数への重畳周波数をATIPフォーマットを利用してFM変調利用するので、請求項7の作用・効果に加え、CD-WO記録装置の復調器回路に従来のATIP復調器回路構成を利用することができる。そのうえ、CD-WOスタンバ製造のためのカッティング装置の変調器回路構成もATIP変調器回路を利用することができる。

【図面の簡単な説明】

【図1】 請求項1に記載の発明の一実施例を説明するための図である。

【図2】 請求項2に記載の発明の一実施例を説明するための図である。

【図3】 CD-WOの半径方向の断面構成を示す図である。

【図4】 CD-WO記録装置の一例を説明するための図である。

【図5】 CD-WOの半径方向の要部断面図及びCD-WO記録装置の例を説明するための図である。

【図6】 ディスク原盤カッティング装置の一例を説明するための要部構成図である。

【図7】 請求項6に記載の発明の一実施例を説明するための図である。

【図8】 請求項6に記載の発明に使用するカッティング装置の一例を説明するための図である。

【図9】 請求項7に記載の発明の一実施例を説明するための図である。

【図10】 CD-WO上に記録されているATIPを説明するための図である。

【図11】 請求項8に記載の発明の一実施例を説明するための図である。

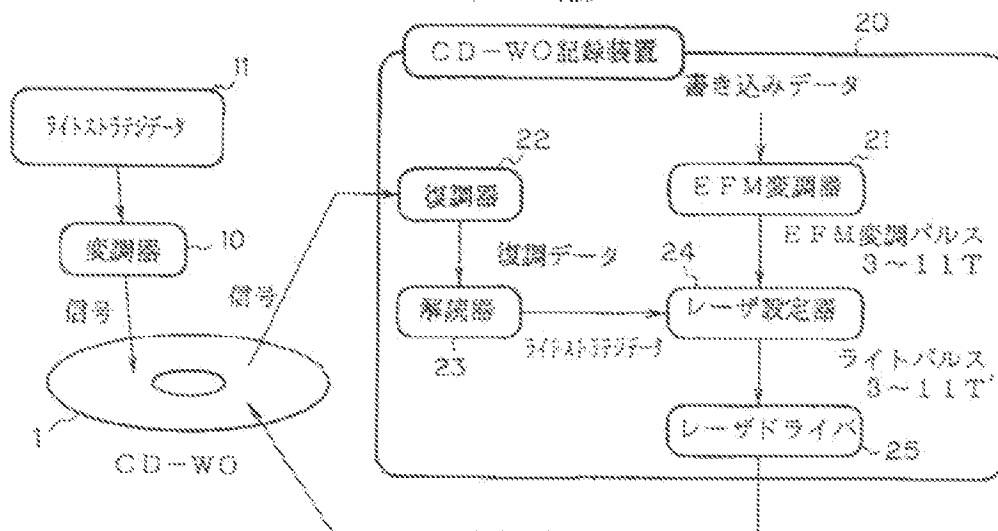
【図12】 請求項9に記載の発明の一実施例を説明するための図である。

【図13】 請求項10に記載の発明の一実施例を説明するための図である。

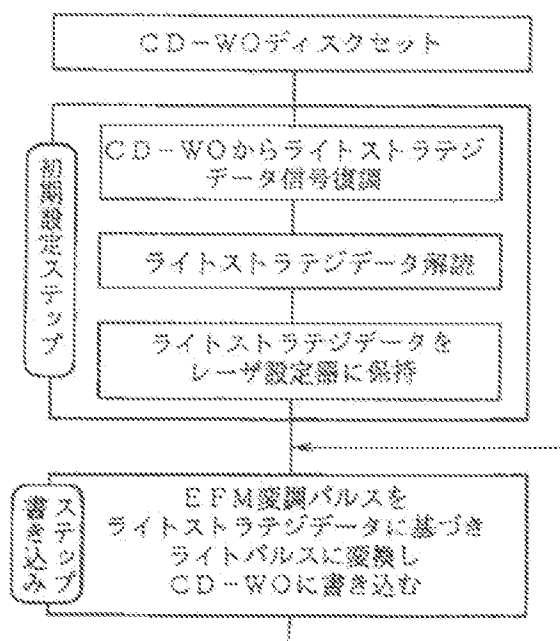
【符号の説明】

1…CD-WO、10…変調器、11…ライトストラテジデータ、12…識別子、20…CD-WO記録装置、21…EFM変調器、22…復調器、23…解説器、24…レーザ設定器、25…レーザドライバ、26…テーブル、27…テーブル検索部、30…領域弁別器、31…ピックアップ、40…変調器、51…EFM変調器、52…領域弁別器、60…変調器、61…信号選択器、62…加算器、71、81、91…バンドパスフィルタ、72、82、92…ATIP復調器、73、83…ATIP特別情報解説器、74、84…ATIP変調器、94…復調器、95…解説器、96…変調器。

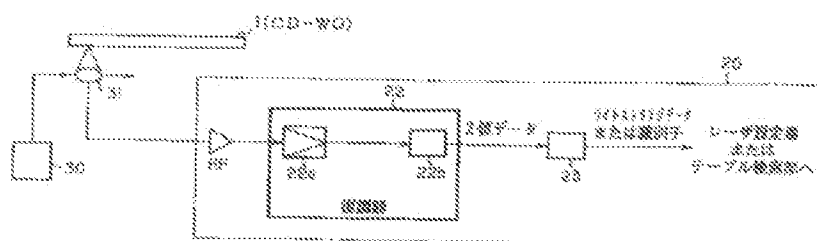
69



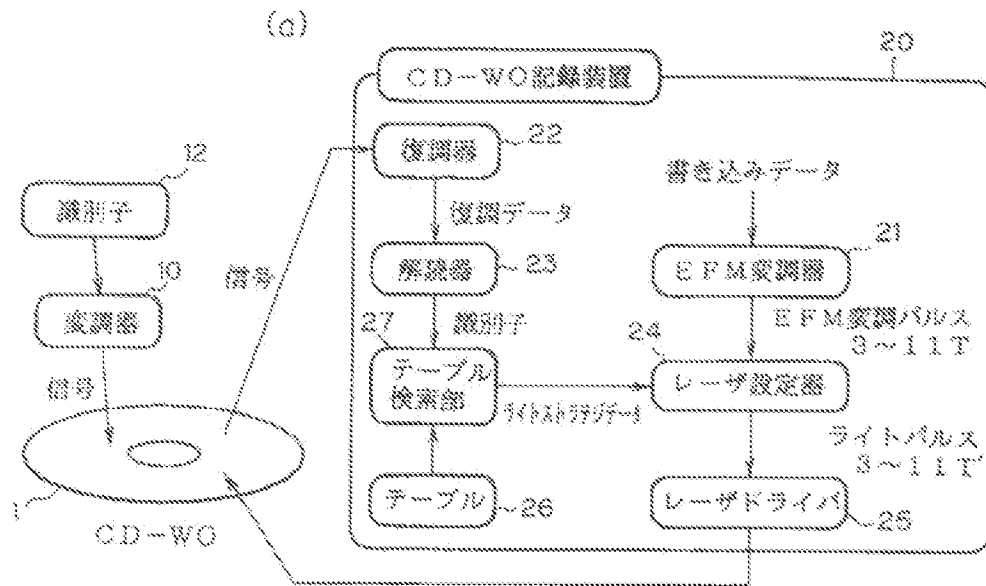
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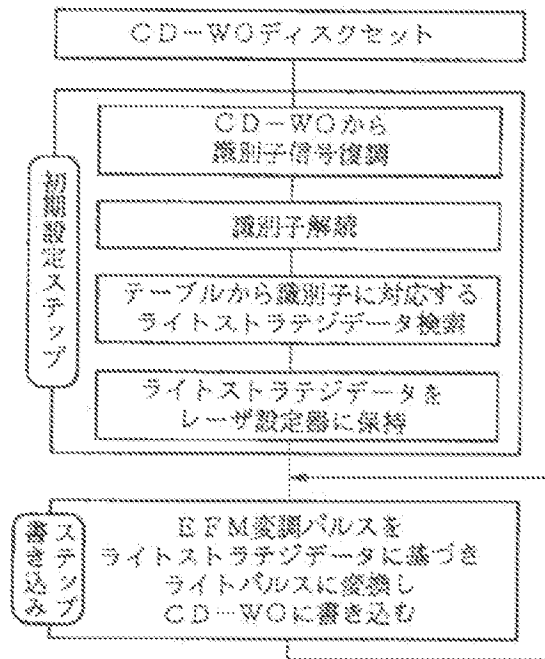
□ □ □ □



【図2】



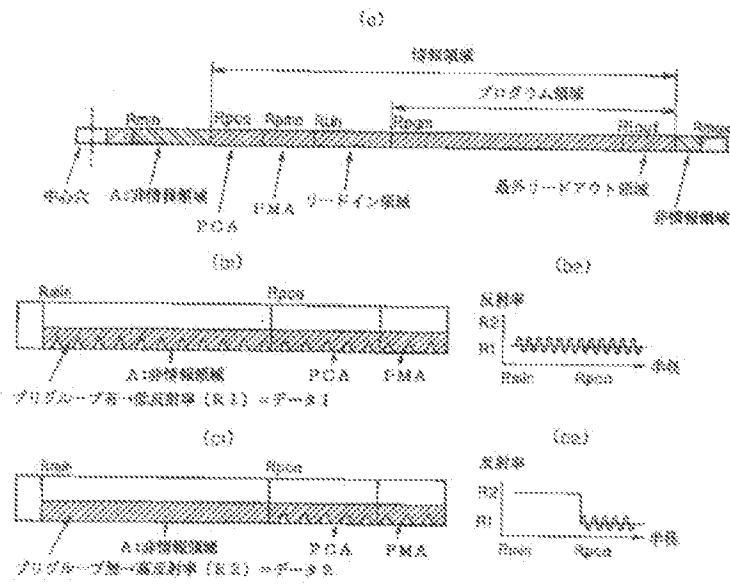
(b)



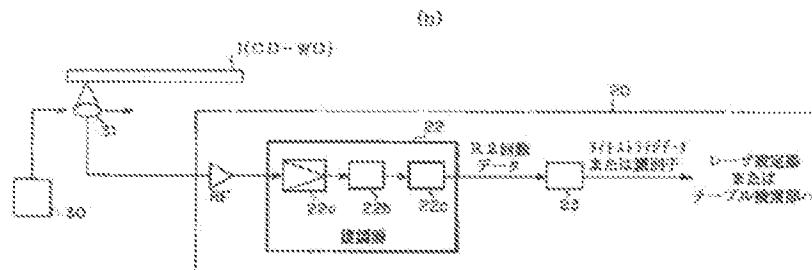
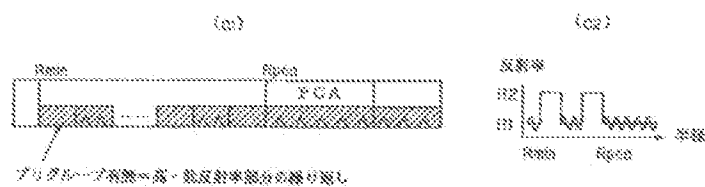
(c)

識別子フィールド	ライトストロージングデータ
Did1	ws1
Did2	ws2
:	:
:	:

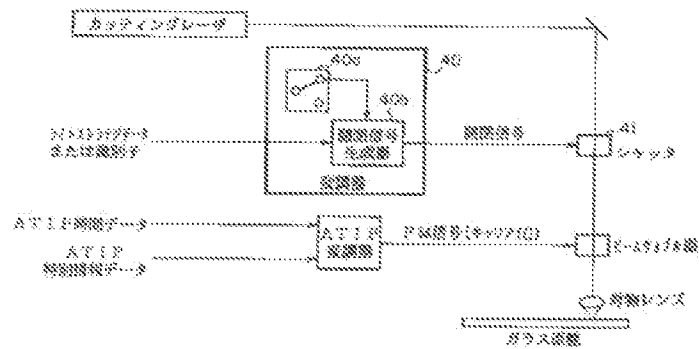
【図3】



【図5】

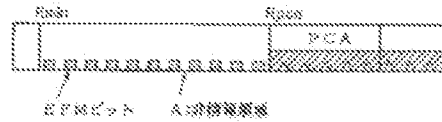


【図6】

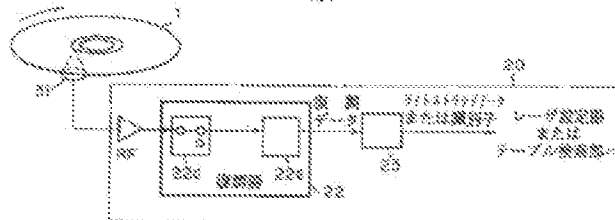


【図7】

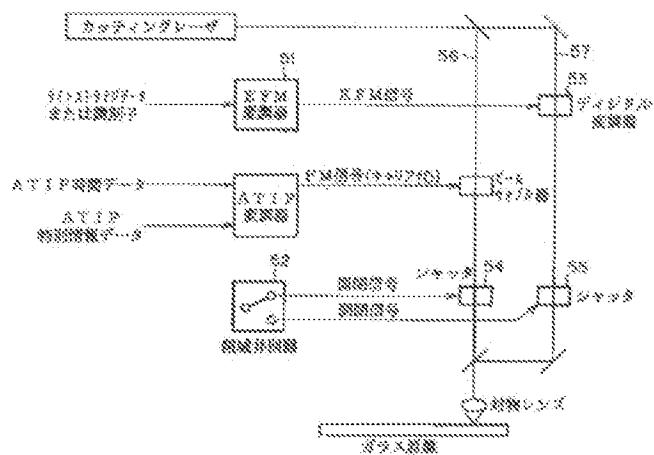
(a)



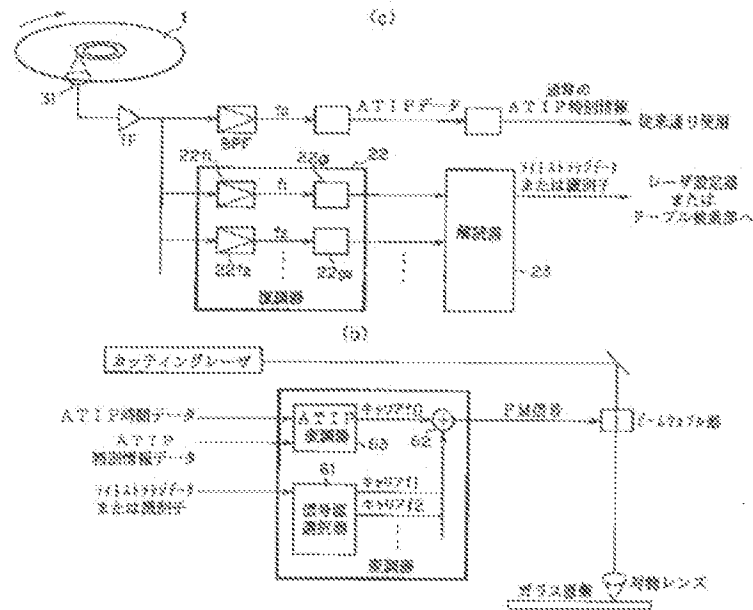
(b)



【図8】



【図9】

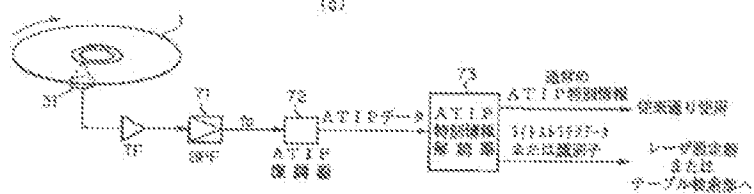


【図10】

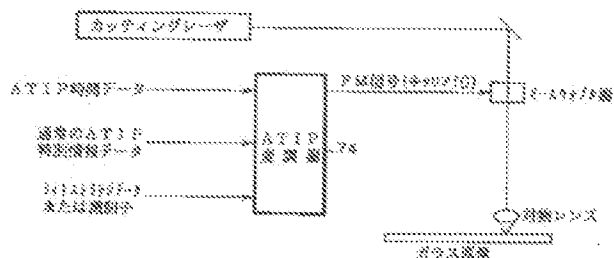
ビット	ビット	ビット	
(a)	1xxxxxxx	0xxxxxxx	リードイン領域とデータの時間情報
(b)	1xxxxxxx	0xxxxxxx	記録パワー/アプリケーションコード
(c)	1xxxxxxx	10xxxxxx	リードイン領域開始時間
(d)	1xxxxxxx	1xxxxxxx	最外リードアウト開始時間
(e)	0xxxxxxx	0xxxxxxx	未使用
(f)	0xxxxxxx	1xxxxxxx	未使用
(g)	0xxxxxxx	1xxxxxxx	未使用

※上記フィールドのxに任意1/0パターンを設定する。

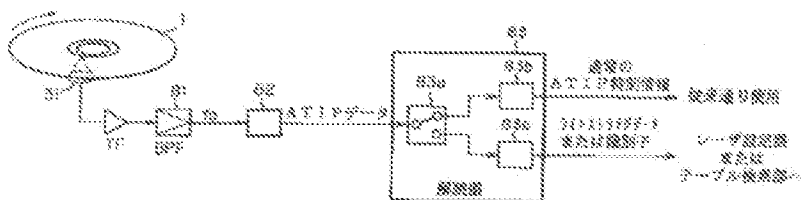
(h)	1xxxxxxx	0xxxxxxx	記録パワー/アプリケーションコードの 未使用フィールド(ビット0-1)
(i)	1xxxxxxx	01xxxxxx	記録パワー/アプリケーションコードの 未使用フィールド (ビット15-8とビット23-16)



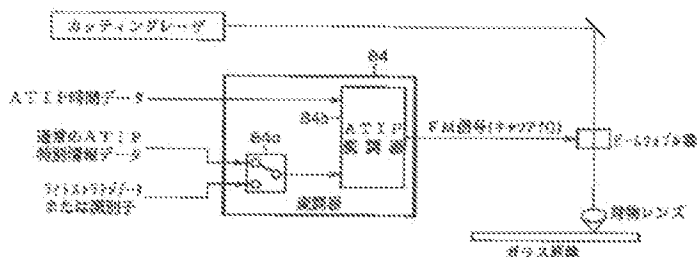
52



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222



【図 13】

